BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

Vol. 26.] 1929. [No. 8.

LEPROSY.

HOPKINS (Ralph) & DENNEY (Oswald E.) **Leprosy in the United States. A Statistical Study of Seven Hundred Cases in the National Leprosarium.**—*Jl. Amer. Med. Assoc.* 1929. Jan. 19. Vol. 92. No. 3. pp. 191–197. With 9 charts in text. [6 refs.] Also in *Public Health Rep.* 1929. Mar. 29. Vol. 44. No. 13. pp. 695–710. With 9 charts in text. [8 refs.]

This paper gives a valuable analysis of 700 cases of leprosy in the Carville U.S. National Leprosarium, formerly the Louisiana Leper Home, during the 34 years of its existence. Of these, 215 were foreign born, mostly from Mexico, China, the Philippines, Italy, Greece and Germany. The very great majority of the home cases came from Louisiana and other southern Gulf States. The present known number of lepers in the United States is 718 against only 242 in HOFFMANN's table of 1920, due to more careful recent search. Of 423 Louisiana lepers only 86 were negroes, 337 were whites, or more than twice as many in the whites in proportion to the population, the explanation of which "is not obvious." [The early history showed that the disease was first introduced among French families, among whom it spread widely.] The types are classified as 11 per cent. nerve, 39 skin and 50 mixed; 72·3 per cent. were males and only 27·7 females as is usual with leprosy, probably due to greater exposure of roaming males to infection. All occupations and social scales are affected, the average age on discovery of the infection was 30 years and on admission 36 years, leaving an average of 6 years of freedom to infect others, as is always the case under compulsory segregation. Some interesting examples of family infection are given; these were often not in chronological order, indicating infection and not heredity. Among 70 cases in 13 families plotted out prolonged exposure for six to ten years or more is shown before infection occurred. Five cases of probably 5 to 7 years incubation are recorded. The incidence of initial lesions mostly on the face and the extremities is in accordance with experience in India. The age of onset is considered in relation to the corresponding ages of a normal population, and the data confirm the comparative rarity under 9 years due largely to long incubation period, and a large proportion of cases between 9 and 30, with the

maximum at about the age of puberty ; this is also in accordance with general experience. The mortality has shown a great decline in recent years, and as elsewhere only 18 per cent. died directly of leprosy, and the majority of lung, renal and septic diseases. During the last 14 years 48 patients were paroled and 20·9 per cent. relapsed, but recently with 18 negative monthly bacteriological examinations before release only 1 of 28, or 3·6 per cent. has relapsed.

L. Rogers.

DENNEY (O. E.). **The National Leper Home (United States Marine Hospital), Carville, La. Review of the More Important Activities during the Fiscal Year ended June 30, 1928.**—*Public Health Rep.* 1929. Mar. 8. Vol. 44. No. 10. pp. 528–534. [1 ref.]

This report deals with the year ending June 30th, 1928 ; that of the previous year was dealt with in this *Bulletin*, Vol. 25, p. 637. It opens thus : " The optimism previously noted among the patients continued during the year." Decreased suffering and mortality and increasing numbers of the paroled were the cause of the optimism, for 11, or 4 per cent. were released with " leprosy arrested " and only one was readmitted for further treatment. Chaulmoogra oil rendered unirritating by the addition of benzocaine was mainly used both orally and by intramuscular injection with very satisfactory results. Proteins have also been injected and one case on hirudin showed great clinical improvement. The neuropsychiatric, surgical and orthopaedic service have been continued and attention has been paid to occupational therapy. Lepers are allowed to pay short visits to their homes under certain restrictions, and everything possible is done to ameliorate the lot of the leper in this model and liberally financed institution.

L. R.

GUSHUE-TAYLOR (G.). **Leprosy in Formosa.**—*China Med. Jl.* 1929. Jan. Vol. 43. No. 1. pp. 6–12. With 2 figs. on 1 plate.

Three years hospital out-patient work showed 260 leper patients, and the total on the island is estimated at not less than 4,000. The disease began mostly between 11 and 40 years, with the largest number from 11 to 20. The majority of the patients attended fairly regularly for treatment and *Hydnocarpus wightiana* oil with 4 per cent. creosote (Hydnocreol of Smith Stanistreet & Co., Calcutta) and alepol have been adopted in place of ethyl esters on account of the far higher cost of the latter, with the result that 70 per cent. have improved, but only a few have as yet fully recovered in the short time available. Sodium bicarbonate in 15 to 30 grain doses was found best for checking undesirable reactions. At least three leper colonies for the isolation and treatment of infective cases are advocated, while nerve and uninfective early cases should be treated at public hospitals, but many decades of work will be necessary for the full success of the campaign.

L. R.

VIGNE (Paul). La lèpre à Marseille. [**Leprosy at Marseilles.**]—*Bull. Acad. Méd.* 1929. Mar. 27. Year 93. 3rd Ser. Vol. 101. No. 12. pp. 438–441.

The author has seen 26 cases and estimates 40 in Marseilles, most from French Colonies and abroad. Two autogenous cases are reported in girls who accompanied their fathers to endemic areas in the tropics and he thinks further powers are needed to check the increase, together with special treatment centres in the large ports.

L. R.

i. WRIGHT (F. C.). **Leper Colony at Riga.**—*Jl. Roy. Nav. Med. Serv.* 1929. Apr. Vol. 15. No. 2. pp. 124–129. With 5 text figs.

ii. PUBLIC HEALTH REPORTS. 1929. Feb. 22. Vol. 44. No. 8. pp. 405–406. **Census of Lepers in Mexico.**

iii. SALZBERGER (M.). Die Lepra der oberen Luftwege und des Ohres in Palästina und Cypern. [**Leprosy of the Upper Respiratory Tract and Ear in Palestine and Cyprus.**]—*Monatsschr. f. Ohrenheilk. u. Laryngo-Rhinol.* 1928. Vol. 62. No. 10. 44 pp. With 10 text figs. & 3 coloured plates. [19 refs.]

iv. KNIAJINSKY (B.). [La lèpre dans l'Ouzbékistan.] [**Leprosy in Usbekistan.**]—*Hygiène et Epidémiologie.* Moscow. 1928. No. 9. [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1929. Jan. Vol. 21. No. 1. pp. 136–137.]

v. MÉTÉLKINE (A.). [Pes-Khona (le village des lépreux à Boukhara).] [**Leper Village in Bukhara.**]—*Ibid.* [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1929. Jan. Vol. 21. No. 1. pp. 137–138.]

vi. ARAUJO (H. C. de Souza). Das Lepraproblem in Brasilien. [**Leprosy Problem in Brazil.**]—*Seuchenbekämpfung.* Vienna. 1929. Vol. 6. No. 1. pp. 25–30. [Oswaldo Cruz Inst., Rio de Janeiro.]

i. During a visit to Riga the author was shown the leper institution with 127 inmates; a second holds 90. About 5 per cent. recover, largely owing to natural causes, after a number of years.

ii. A first census of leprosy in Mexico resulted in returns from only 435 of the 2,272 municipalities, and 1,450 cases were registered, half being nodular ones. The provincial distribution and age incidence is given. Of 652 histories 359 acquired the disease by contact, and the majority of known cases live in crowded filthy conditions.

iii. In Cyprus there are 80 cases at the Leper Institute near Nicosia and a few more in the town. In Jerusalem there are 30 cases, 17 nodular, 8 mixed and 2 nerve forms. A detailed clinical description of cases with good illustrations follows.

iv. Isolated cases not exceeding 100–150 are present in the Republic of Usbekistan in Central Asia, and there is a leprosarium at Tashkent and village isolation elsewhere, but the inmates are allowed to go out begging. Cases of vitiligo are often confused with true nerve leprosy.

v. In Bukhara leprosy is believed to be highly contagious and isolation is demanded in special leper villages and quarters of towns. The number of lepers is not apparently known.

vi. Dr. de Souza-Araujo gives a further account of leprosy in Brazil. A table shows an estimate in July, 1927, of a total of 11,894 cases, against an approximate estimate in 1924 of 24,000. The largest numbers are found in S. Paulo with 4,620 and in Para with 2,540, but no other state has as many as 1,000. A list of the leprosaria and hospitals for lepers is given.

L. R.

DA MATTA (Alfredo). O censo da lepra no Amazonas e sua revisão (1922 a 1928). [**Leper Census in the Amazonas, 1922-1928.**]—*Brasil-Medico.* 1929. Mar. 2. Vol. 43. No. 9. pp. 226–228. Also in *Sciencia Med.* 1929. Mar. Vol. 7. No. 3. pp. 106–114.

This is an enumeration of the cases of leprosy recorded from 1922–28 inclusive, in the District of Amazonas, together with the distribution according to age, sex, and calling. The figures as given amount to 1,001, but by faulty addition is called 971, and the subsequent information is based on the latter. 70·7 per cent. were of the anaesthetic form, 15·2 per cent. nodular, and 14·1 per cent. mixed. The number of males was rather more than twice that of the females.

H. Harold Scott.

PUENTE (José J.). El problema de la lepra en la República Argentina. [**Leprosy in the Argentine.**]—*Semana Méd.* 1929. Mar. 28. Vol. 36. No. 13 (1837). pp. 756–761.

The census of the National Department of Hygiene gives the number of lepers as 1,560, but probably the total is in the neighbourhood of 5,000–6,000, or 0·5 per mille. Every Province has some lepers, the central more than the rural. Most are of the labouring classes.

H. Harold Scott.

WORLD'S HEALTH. 1929. Jan.–Mar. Vol. 10. No. 1. pp. 59–71. **Leprosy To-Day. Leprosy in Japan** [TAKANO (Rokuro) pp. 59–67]. **The Work for Lepers in Siam** [VALLABHAKARA (Prince) pp. 68–70]. **The Campaign against Leprosy in Colombia** [BEJARANO (Jorge) p. 71].

Dr. Takano's article on leprosy in Japan gives interesting data indicating a decrease of the disease in recent years. An investigation in 1925 showed a total of 15,351 cases, over two-thirds being males and with the usual age distribution, and a table of the detailed distribution is given, the general rate being 0·257 per mille. A prophylactic law was passed in 1907, since which the leprosy deaths as compared with those from other cases has fallen by about 60 per cent., and the number of lepers found in the annual examination of recruits has been reduced from 483 to 215. There are five sanatoria for leprosy in Japan to hold 1,530, but the accommodation is to be increased to 4,500 by 1930, and half the cost of the buildings and one-third of the upkeep is being provided by Government. Private sanatoria can hold 507 more patients mostly under missionary bodies. Under favourable housing conditions and superintendance lepers can be treated at home as in Norway. Moreover, an area near the Kusatsu thermal establishment, in the healing powers of which lepers have confidence, is to be reserved as a settlement for lepers with proper

treatment. A scientific association against leprosy has been organized in the work of which the Japanese Mission to Lepers is collaborating. The outlook is becoming increasingly hopeful.

In Siam, with a population of 10,000,000, the lepers are estimated at not less than 20,000, presenting a difficult problem. Twenty years ago Dr. J. W. McKean first organized a leper settlement on jungle land of the Government at Chiengmai in north Siam, which now has 300 inmates. In 1922 the Siamese Red Cross Society established a clinic in the capital, Bangkok, to provide the new effective treatment free for early cases, and last year over 1,000 lepers attended with great benefit to 33 per cent. and improvement in 29 per cent. more ; locally manufactured ethyl esters were used. In 1923 a Red Cross leper asylum was also established near the city for the voluntary isolation of advanced infective cases with 180 inmates, soon to be raised to 400, with treatment, family life and a school for children. A good start has thus been made, although the main problem is still untouched.

The Republic of Colombia is also tackling the leper problem vigorously and maintains three institutions ; the largest has received 3,522 patients, and the other two hold 3,517, or a total of 7,039 in a population of 7,000,000.

L. R.

Lie (H. P.). **Why is Leprosy decreasing in Norway ?**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Jan. 30. Vol. 22. No. 4. pp. 357–366. With 2 figs. [2 refs.]

This is a most interesting account of the success of the humane Norway system of isolation, with as little compulsion as possible, in reducing the number of lepers from 2,858 in 1856 to about 90 at present, or from 2 to 0·03 per mille in about seventy years. The ancient history of the disease in Norway is first given ; it has been present for 1,000 years ; no new case has been seen for the last two years, and few but old uninfective nerve cases now remain, while the number of new cases in the five year period up to 1925 was 15 against 1,040 in the five years to 1865. He rightly lays stress on the fact that the most infectious cases were chiefly isolated, while home isolation where good sanitary conditions made it safe was permitted. He gives data to show the danger of close association in houses with lepers, especially in producing infection of the highly susceptible children, and this was greatly diminished by isolation, but he also gives due weight to the value of improved economic conditions, hygiene and sanitation in favouring the decline of the disease, but concludes that " as an important factor in this respect isolation, conceived and applied as I have shown above, has played a considerable role." This paper furnishes very striking evidence in favour of that conclusion.

L. R.

Tisseuil. Les léproseries partielles en Nouvelle-Calédonie. [**Leper Villages in New Caledonia.**]—*Bull. Soc. Path. Exot.* 1929. Feb. 13. Vol. 22. No. 2. pp. 95–114. With 3 text figs. & 1 folding map. [7 refs.]

In this paper the author returns to the subject [*ante*, p. 334] and records at length once more the history of the varying efforts at pro-

phylaxis against leprosy in the island of New Caledonia. At present there are 58 leper villages, mostly with less than ten lepers and with little or no supervision or treatment, except where missionaries are available. In the Loyalty Islands the leper villages are rather larger, and in Lifou one under missionaries had 182 patients. Financial difficulties have prevented improvement of the system, which is very inefficient.

L. R.

MUIR (E.). **The Campaign against Leprosy.**—*Indian Med. Gaz.* 1929. Feb. Vol. 64. No. 2. pp. 92–95.

In India since 1925 the Indian Council of the British Empire Leprosy Relief Association has worked to replace the old method of forceable segregation by voluntary clinics under doctors trained in the modern treatment, which allows the majority of early cases to be cleared up and kept free from active signs and infection of leprosy, and now patients are coming forward early instead of hiding their disease. Propaganda in the villages is teaching how to prevent contagion and surveys are being carried out, with resulting opening of new clinics and breaking down of the old belief that the disease is irremediable. A leprosy film illustrating the modes of infection and treatment is drawing large crowds to the cinemas and has a good educative effect.

L. R.

UNNA, Jr. (Paul). Die Bekämpfung der Lepra. [**The Control of Leprosy.**]—*Dermat. Woch.* 1928. Dec. 15. Vol. 87. No. 50. pp. 1921–1926.

The author traces the development of public opinion regarding the transmissibility of leprosy from the middle ages when lepers were outcastes from society, through the First Leprosy Conference, Berlin, 1897, when compulsory isolation was still demanded and the Second Leprosy Conference, Bergen, where there was a tendency to milder measures, to the Third Conference at Strassburg, in 1923, when it was recommended that measures should be suited to different countries. Since then many writers, with whom the author agrees, have endeavoured to show the futility of compulsory isolation, which has the effect of causing patients to conceal their disease and thus become a danger to their neighbours just at the period when they are most infectious and most easily cured. Treatment, not isolation, is necessary. Two cases are quoted to show how easily even advanced cases escape recognition in Europe where few doctors are familiar with the disease. Compulsory isolation is a relic of mediaeval barbarism that must be superseded by early recognition and early treatment. Only in the case of homeless persons such as beggars and tramps should lepers be treated in special institutions, otherwise in their own homes or as out-patients at polyclinics, where all incipient cases should be registered. The particular method of treatment adopted is of less importance than that it should be carried out as early as possible.

L. R.

LEPROSY NOTES. 1929. Apr. No. 5. 36 pp. Issued Quarterly by the British Empire Leprosy Relief Association.

This number gives information regarding the incidence of leprosy in Europe and in the Dutch East Indies, on work in Ceylon and in Madras. It includes articles by Dr. J. LOWE on early diagnosis and on the potassium iodide treatment, which he finds to have very few, if any, advantages, and many disadvantages as compared with chaulmoogra and hydnocarpus oil derivatives. Dr. R. G. COCHRANE (now Secretary to the British Empire Leprosy Relief Association) reports favourably on the use of alepol, and he has been able to give as much as 10 cc. of a 6 per cent. solution intramuscularly twice a week without pain. The facilities for the study of leprosy in Great Britain are dealt with by Dr. Andrew BALFOUR, who draws attention to the fine illustration of the disease at the Wellcome Museum of Medical Science.

L. R.

MOTTA (Joaquim). Cancro leproso. [**The "Primary Sore" of Leprosy.**]—*Folha Med.* 1929. Mar. 15. Vol. 10. No. 8. pp. 87–88.

The so-called "leprous chancre" is not a new idea; BAJON is said to have spoken of it more than 150 years ago. On an analogy with syphilis the generalized rash would indicate some primary site of infection. The author guardedly does not undertake to support the theory, but relates a case in which there was an isolated ocular lesion and records it as a typical instance. Sections of a portion removed showed no acid-fast bacilli, but, as ROGERS and MUIR have noted, "many of the primary infections which we have found in the skin have failed to show any bacilli."

H. Harold Scott.

LOWE (John). **Nerve Abscess in Leprosy.**—*Indian Med. Gaz.* 1929. Jan. Vol. 64. No. 1. pp. 24–25. [1 ref.] [Leper Hosp., Dichpali, Nizam's Govt., State Ry.]

In about 1,000 cases of leprosy nerve abscesses have been met with in 19, always in the arm, and in 14 of the cases in the ulnar nerve, usually three or four inches above the elbow. The nerve is commonly involved for two or more inches and adherent to surrounding structures, while the contents of the abscess are cheesy. Increased pain in the nerve and anaesthesia in its distribution result and are relieved by operation; abscess may follow a reaction and is more frequent under iodide treatment. The sheath of the nerve should be incised and the abscess lightly scraped out, the nerve trunk should be freed from adhesions, but drainage is unnecessary, while both pain and contraction of the fingers may be prevented by this treatment. He agrees with MUIR that ephedrin prevents or minimizes nerve lesions during treatment.

L. R.

FRANCHINI (Giuseppe). Setticemia da bacilli di Hansen in un caso di lebbra nodulare. [**Bacillaemia in a Case of Nodular Leprosy.**]—*Arch. Ital. Sci. Med. Colon.* 1928. Nov. Vol. 9. No. 11. pp. 643–646. With 2 figs. on 1 plate. [Inst. of Trop. Path., Univ., Bologna.]

Blood taken from a vein in this patient, a man of 45 years, from Brazil, was stained by the Ziehl–Neelsen method and Hansen's bacilli were found, some free, others within leucocytes, especially the large mononuclears. There was no rise of temperature at the time the specimen was taken.

H. Harold Scott.

GREEN (Richard). **Some Observations on the Leprous Reaction. (Synonyms :—Leprotic Fever ; the Acute Exanthem of Leprosy; Lepra Reaction, etc.).**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1929. Jan. 30. Vol. 22. No. 4. pp. 367–380. With 21 figs. on 6 plates & 2 charts. [22 refs.] [Inst. for Med. Research, Kuala Lumpur, F.M.S.]

This is an interesting discussion of the vexed question of leprous reactions. The following are the author's summary and conclusions :—

" 1. The leprous reaction has been discussed in its various aspects which include the frequency of occurrence, associated cutaneous and nerve lesions, predisposing factors, duration, benefit or otherwise to the patient, theories concerning causation, and treatment.

" 2. Brief observations on patients at the Kuala Lumpur Settlement are recorded from these points of view.

" 3. A wider recognition of the condition as a distinct phase of leprosy is suggested among those concerned with lepers and among dermatologists, particularly in the tropics. More frequent records from workers in leprosy should assist in bringing this about.

" 4. Factors which predispose to the reaction in each class of patient should be investigated and kept in mind during treatment.

" 5. In using treatment which may induce reaction, distinction should as far as possible be drawn between the stages of leprosy reached by patients, with a view to anticipation and avoidance of reactions at undesirable stages ; the beneficial effect of the reaction being apparently confined to lepers in MUIR's third stage.

" 6. The leprous reaction appears to have its origin as an acquired condition of allergy towards *M. leprae* already in the tissues. This condition, combined with the possible multiplication and dissemination of the *M. leprae* at this period, may account for the appearance of all the subsequent manifestations of the reaction.

" 7. Treatment of the leprous reaction, from the point of view of desensitization with adrenalin or ephedrine, appears to be effective in the majority of cases."

L. R.

JEANSELME (E.), GIRAUDEAU (R.) & BUREAU (Yves). De l'exploration de la fonction sudorale au niveau des manifestations tégumentaires de la lèpre, par la méthode de l'ionisation de pilocarpine. [**Sudoral Function in Skin Manifestations of Leprosy.**]—*Bull. Soc. Française Dermat. et Syph.* 1929. Mar. No. 3. pp. 139–148. [3 refs.]

The authors have used the method of ionization with pilocarpine in a cream to test the alterations in the sweating power of the skin

in leprosy. They describe six trials, which showed that the loss of the power of sweating of affected areas of the skin might be partial or complete. Microscopical examinations also demonstrated greater or less degrees of atrophy of the sweat glands in the affected skin.

L. R.

DAVISON (A. R.). **A Note on Leprous Lesions of the Scalp.**—*Lancet.* 1929. Apr. 6. p. 717. With 1 text fig.

The author reports that, contrary to the experience of MUIR in India, he has found lesions of leprosy to be frequent on the scalp of African patients in the Emjanayana Leper Institute of South Africa, and he illustrates macular and nodular lesions in this position. He suggests that the African natives are predisposed by lack of cleanliness and the frequency of scalp injuries in stick fights affording opportunities for the entrance of the lepra bacilli.

L. R.

CROZIER (G. G.) & COCHRANE (Robert G.). **Leprosy in an Infant.** [Memoranda.]—*Brit. Med. Jl.* 1929. Mar. 16. pp. 501–502.

A female child was born to leper parents, who were under treatment in Assam, on December 25th, 1924, with an ulcer on the right heel which recovered in two weeks under hydnocarpus oil locally. The child and her parent left apparently cured in May, 1925, but returned in seven months with a typical discoloured leprous patch on the scapular region of the child, which disappeared in two months under hyndocarpus oil injections, and the child remained well up to June, 1928. The mother was not infectious, but the father was at the time of the birth of the child, and no lepra bacilli were found in the child's heel ulcer, so it is doubtful whether the disease was congenital or acquired.

L. R.

WADE (H. W.). **Leprosy.**—*Milit. Surgeon.* 1929. Jan. Vol. 64. No. 1. pp. 81–90.

This address by a high authority before a Medical Conference at Manila gives a brief general account of the etiology and pathology of the disease.

L. R.

ROBINEAU. Considérations sur le mode de contagion de la lèpre. [**Mode of Contagion of Leprosy.**]—*Ann. de Méd. et de Pharm. Colon.* 1928. July–Aug.–Sept. Vol. 26. No. 3. pp. 305–322. [15 refs.]

This paper reviews the evidence on contagion, and concludes that the healthy are infected by repeated inoculations directly or indirectly from neighbouring lepers, who may be apparently healthy. No insect is the intermediate host, but domestic insects may play a mechanical role, and some solution in the continuity of the skin or mucous membrane affords access to the lepra bacilli, the transit of which should be prevented.

L. R.

RANGEL (Mario). Aspectos diversos do problema da lepra. Tentativas de cultura do bacillo de Hansen.—A lepra transmittida pelos insectos? O "Eparseno" no tratamento da lepra. [**Aspects of the Leprosy Problem.**]—*Rev. Med.-Cirurg. do Brasil.* 1928. Nov. Vol. 36. No. 11. pp. 465–469.

The author mentions the well-known attempts at cultivation of the bacillus and he himself tried by inoculating leproma emulsion into Ringer-Locke serum, but with negative results. As regards insect-transmission, examination of *Culex pipiens* caught in the leper hospital failed to reveal any acid-fast bacilli, but between 40 and 50 per cent. of bugs and flies [not further identified in the paper] caught in the beds or near the patients had acid-fast bacilli in their intestines. He records two cases treated with eparseno injections, starting with 0·5 cc. dose; one had 14 cc. in three months and then died, the other had 25 cc. in the same period. Neither patient showed the least improvement or even arrest of the disease.

H. Harold Scott.

DE LANGEN (C. D.). Specifieke huidreacties bij Lepra.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Feb. 20. Vol. 69. No. 2. pp. 156–164.

——. **Specific Skin Reactions in Case of Leprosy.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1929. Vol. 18. No. 1. pp. 113-119.

Repeating the experiments of BARGEHR (see this *Bulletin,* Vol. 24, p. 216) but using sterilized and pulverized leproma substance, the author was able to confirm BARGEHR's conclusions. In some healthy individuals he also succeeded by repeated and extensive inoculations in turning the negative reaction into a positive one. The reaction is very probably specific and therefore it may become of practical importance.

1. It may be an aid in the diagnosis of early cases; and
2. In distinguishing between active cases with a negative and old inactive healed cases with a positive reaction to lepromin; the old inactive cases have probably no further epidemiologic significance.
3. A positive reaction in a person who has frequently been in contact with lepers justifies the opinion that he has acquired sufficient resistance against the infection.
4. Possibly the test may become of some prophylactic significance.

Therapeutic experiments with lepromin so far have only yielded negative results.

W. J. Bais.

DE VOGEL (W.). Réaction de Pirquet provoquée par la substance stérilisée des lépromes. Expériences faites par le Dr. BARGEHR, ancien Directeur de la léproserie de Pelantoengan (île de Java). [**Pirquet's Reaction in Leprosy.**]—*Bull. Office Internat. d'Hyg. Publique.* 1929. Jan. Vol. 21. No. 1. pp. 101–105.

This paper summarizes the already published results obtained by BARGEHR in the Dutch East Indies by the intradermal injection of lepromin made from leprous nodule with positive results in apparently healthy persons living with lepers and in recovered or burnt out nerve cases, but negative ones in persons never in contact with lepers (see this *Bulletin,* Vol. 24, pp. 559 and 910; Vol. 25, p. 203).

L. R.

i. PELTIER (M.). De la valeur technique de la méthode de Rubino dans la recherche de la sédimentation globulaire chez les lépreux. [**Value of Rubino's Method of Sedimentation in Leprosy.**]—*Bull. Soc. Path. Exot.* 1928. Dec. 12. Vol. 21. No. 10. pp. 836–838.

ii. MARKIANOS (J.). Réaction de sédimentation des globules de mouton formolés dans la lèpre.—*Ibid.* 1929. Mar. 13. Vol. 22. No. 3. pp. 152–155. [7 refs.]

i. RUBINO's original red corpuscle sedimentation test, and the modification of MARCHOUX and CARO in which the reaction is made more sensitive by increasing the proportion of leprous serum, have been tried with 22·2 per cent. of positive reactions with the former and 33·3 per cent. with the latter with leper's serum, but Marchoux and Caro's method gave 17·3 per cent. of positive non-specific reactions with non-leper serums against none by Rubino's plan.

ii. Markianos, as the result of his tests, found the reactions negative except in the case of lepers, and he prefers Marchoux and Caro's technique as the more sensitive.

L. R.

HENDERSON (John M.), DE (N. K.) & GHOSH (S.). **Notes on some Haematological and Serological Investigations in Leprosy.** —*Indian Jl. Med. Res.* 1929. Jan. Vol. 16. No. 3. pp. 687–694. [30 refs.] [School of Trop. Med. & Hyg., Calcutta.]

Observations are recorded on the specific gravity of the blood, estimated by glycerine and water solutions, the fragility of the red corpuscles and the surface tension of the serum in leprosy cases. It was found that in cases showing increased rate of sedimentation of the erythrocytes there was also a tendency to a fall in the specific gravity of the blood and in the surface tension of the serum irrespective of the type or stage of the disease.

L. R.

i. GOMES (J. M.) & DO PATEO, Jr. (J. Duarte). Desvio do complemento na lepra. [**Complement Deviation in Leprosy.**]—*Rev. Biol. e Hyg.* S. Paulo. 1928. Vol. 1. No. 3. pp. 89–102. English summary pp. 102–104. [13 refs.] [Hyg. Inst., S. Paulo.]

ii. TAMIYA (Teiryo). **Studies on Thermal Influence upon Wassermann Reaction. Especially on the Diagnostic Account of the Freezing-Point Method in Non-Specific Wassermann Reaction with Leprous Serum.**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1927. Vol. 6. pp. 165–179. With 2 figs. [27 refs.]

i. This worker concludes that complement deviation in leprosy with defatted *Streptothrix leproides* of Deycke is of diagnostic value, and also in treatment and prognosis. It is also of value in early cases and its strength indicates the seriousness of the disease.

ii. The author reports that on modifying the Wassermann test by treating the serum primarily at the freezing point negative reactions are obtained with non-syphilitic leper sera, but positive ones in syphilis.

L. R.

SALMINEN (Yrjö W.). Ueber die wassermannsche Reaktion im Serum Leprösen und ueber Liquoruntersuchungen bei Lepra. [**The Wassermann Reaction in the Serum and C.S.F. in Leprosy.**]—*Acta Soc. Med. Fennicae "Duodecim."* Helsingfors. 1928. Vol. 10. Fasc. 1/2. No. 2. 84 pp. [109 refs.] [Dermat. Clinic, Helsingfors, Finland.]

This detailed paper, with a number of references and experiments, arrives at the following conclusions: The cerebro-spinal fluid in leprosy shows not very considerable changes, probably of short duration, in the form of an increase in the cellular content and in the albumin present. The Wassermann test with the fluid is always negative. The changes noted are probably related to pathological lesions of the central nervous system, since the author found them chiefly in nerve forms of leprosy, and in maculo-anaesthetic types rather than in nodular cases. Examination of the cerebro-spinal fluid in leprosy is not of very great significance, except in the diagnosis of nerve forms of leprosy from syringomyelia, for in the latter disease the cerebro-spinal fluid is normal, so temporary pathological changes in this fluid suggest leprosy.

L. R.

SCHIRWINDT (S. L.). Zur Frage der serologischen Reaktion bei der Lepra. [**The Serological Reaction in Leprosy.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Vol. 59. No. 5–6. pp. 461–478. [8 refs.] [Central Serolog. Lab., Leningrad.]

Summary.

1. In spite of the statements of most authors and of our own data obtained in 1922 and 1926 regarding the high percentage of non-specific positive results of the Wassermann Reaction in leprosy we consider a further trial necessary, for the results obtained by us in 1927 with the employment of fresh leprous sera gave a relatively small percentage of positive reactions (6·4 per cent.); at the same time it is often difficult to exclude the simultaneous existence of latent syphilis.

2. Leprous sera possess marked complementary properties; in the rare cases where the haemolysis occurs rapidly in the controls with the usual method for the Wassermann reaction (dilution of the serum to 1 : 5) and a positive result is obtained, the possibility of some other simultaneous infectious disease (latent syphilis) must be considered.

The modifications of the Wassermann reaction according to BOAS (titration of the sera) or still better according to KAUP, are most appropriate for leprous sera; the method which is given in the "All-Russian Instruction for the method of the W.R.," is difficult to apply for this purpose.

3. If regard be had to the rapidity with which leprous sera develop complementary properties even when kept for only a short time (according to FERRANI), and these sera be subjected to the W.R. and to the other serological investigations which are employed in syphilis as soon as possible after the withdrawal of the blood (best in the first 12 hours afterwards), then completely specific results of these reactions will be obtained and in pure forms of leprosy negative results will follow.

4. Since the process of inactivation probably accelerates the formation of anticomplementary properties in leprous sera, the employment of the active modification of the W.R. is to be specially considered in leprosy.

5. In examining leprous sera one should not limit oneself to the W.R. or any one of the other reactions, but the sera must be tested with all the reactions that have been proved in the serology of syphilis; the

occurrence of a positive result in all these reactions is a rare phenomenon and the percentage of such positive results according to our material is 3·2, in which in a certain number of cases one may assume the simultaneous existence of latent syphilis.

6. Bruck's active method, which gave only 6·3 per cent. of positive results and extremely interesting data in regard to the haemolytic properties of leprous sera in an active state, deserves attention and further investigation.

7. The Sachs-Georgi reaction, which in our material gave 10·7 per cent. positive results in 1926 and 20 per cent. in 1927, as well as the Kahn reaction, which is similar in nature to the first-named and showed 12·5 per cent. positive results, can with difficulty be employed for the examination of leprous sera; we are unable to confirm the findings of Rosentul and Prichodtschenko on the Sachs-Georgi reaction.

8. Of Meinicke's reactions one should in the first place try the third modification (D.M.), which gave an almost equally small percentage of positive results in 1926 (5·5 per cent.) and 1927 (5·4 per cent.); Meinicke's turbidity reaction (M.T.R.) gave in 1926 10·7 per cent. positive results, it was not tried in 1927; the microreaction (M.M.R.) gave in 1926 17·8 per cent. of positive results which were considerably more favourable in 1927 when only 6·4 per cent. positive results were obtained; the last-named reaction has a special advantage in that only a minimal quantity of blood-serum is necessary for the examination (2 to 3 drops).

9. For the differential diagnosis between leprosy and syphilis by means of serological examinations the first place must be given to the Wassermann reaction of the complement fixation method and the active method of Bruck; out of the whole series of precipitation, turbidity and flocculation reactions Meinicke's reaction in its third modification (D.M.) and his microreaction (M.M.R.).

L. R.

Hoffmann (W. H.). Ueber latente Immunisierungsvorgänge bei der Lepra. [**Latent Immunization Processes in Leprosy.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1929. Vol. 59. No. 3/4. pp. 297–305. [Finlay Inst., Health Ministry, Havana, Cuba.]

In leprosy there is an infection which runs its course without any symptom and a latent immunity is produced thereby.

These latently infected and thereby more or less immunized cases probably play a large part in the epidemic distribution of leprosy, since they are difficult to recognize.

With improved serological methods these cases will probably be discovered to a great extent in careful examinations of the contacts of known cases and can thus be brought under early treatment.

This may be regarded in the future as one of the most important aids in the campaign against leprosy. In conjunction with the present-day means of treatment it offers prospects of an effective stamping out of leprosy as an endemic disease.

L. R.

Macht (David I.). **Phytopharmacological and Photopharmacological Studies on Leprosy Blood Serum.**—*Jl. Philippine Islands Med. Assoc.* 1928. Dec. Vol. 8. No. 12. pp. 523–524. [8 refs.]

The author applies these terms to the study of the effects of various drugs and toxins on living plant protoplasm; by this means he found

that the toxin of pernicious anaemia is very susceptible to the effects of ultra-violet rays, and he now reports that such rays did not detoxicate the serum of leprosy.

L. R.

KEIL (Ernst) & UNNA, Jr. (Paul). Versuche zur Kultivierung und Reinzüchtung des Lepraerregers. Vorläufige Mitteilung. [**Attempts at Cultivation and Pure Culture of the Leprosy Germ.**]—*Dermat. Woch.* 1928. Oct. 27. Vol. 87. No. 43. pp. 1663–1665. [2 refs.]

Encouraged by the good results of Hohn's method for cultivating the tubercle bacillus the authors applied the same technique to the culture of the leprosy germ using as controls similar cultures of tubercle bacilli. Three weeks after inoculation slightly raised yellowish-white colonies were clearly visible macroscopically in the tubes containing tubercle-inoculated sputum, while in the leprosy tubes scarcely any changes were demonstrable. After the fourth week definite changes were also visible in the culture media inoculated with leprosy bacilli. The place where the platinum loop carrying the leprous material had touched the culture medium was now easily visible. The surface here assumed a grey, opaque appearance and tiny prominences were visible macroscopically. After 40 days the TB cultures showed colonies the size of a pinhead, while those in the parallel cultures of leprosy bacilli of the same age had reached the size of a fine grain of sand. Microscopic examination of streak preparations prepared from 4-weeks-old leprosy cultures, showed that the growth of the leprosy bacilli was, in fact, very probable.

The bacilli in the juice expressed from the leproma stained with carbol-fuchsin (with HCl-alcohol decoloration) as usual in the form of a deep-red homogeneous bacillus. After 4 weeks culture, however, they stained considerably lighter with carbol-fuchsin and showed a coccothrix form. This disposes of the theory that the coccothrix form is a sign of degeneration, for it can in the circumstances of the authors' experiments be only a proliferation form of acid-fast bacilli.

L. R.

ARAUJO (H. C. de Souza). [In Portuguese & English.] Estudos sobre a lepra. II. Tentativas de cultura do *Mycobacterium leprae* (*Coccothrix leprae* Lutz, 1886). Isolamento de um actinomyces de um leproma. O *Actinomyces lepromatis*, n. sp. Nota prévia. **Studies upon Leprosy. II. Attempts to cultivate the** *Mycobacterium leprae* (*Coccothrix leprae* **Lutz, 1886.) Isolating an Actinomyces from a Leproma. The** *Actinomyces lepromatis*, **n. sp. Preliminary Note.**—*Inst. Oswaldo Cruz. Supplemento das Memorias.* 1928. Dec. No. 4. In Portuguese pp. 141–142. With 11 figs. on 3 plates. In English pp. 143–144.

——. Essais de culture du *Mycobacterium leprae* (*Coccothrix leprae* Lutz, 1886). Isolement à partir d'un léprome d'un actinomyces, *Actinomyces lepromatis* n. sp.—*C.R. Soc. Biol.* 1929. Apr. 8. Vol. 100. No. 11. pp. 937–939.

In these two papers the author reports success after many failures in cultivating an Actinomyces, which he calls " Actinomyces lepromatis," from excised nodules of a leper in Brazil in a culture medium of glycerine

broth, growth first appearing after fifteen days. On staining, the culture showed a mixture of acid-fast and non-acid-fast filaments, and subcultures were obtained on agar, broth and potato with 5 per cent. glycerine. Subsequent cultures gave only the characteristic filaments of an actinomycosis. He further states that he has already obtained the same results from four patients, so his work confirms that of previous observers, including KEDROWSKY who also thinks the leprosy bacillus belongs to the Actinomyces group. The fungus produces radiating furrows with pigmentation, is gram-positive, non-acid-fast and shows the morphology of the first type of actinomyces with rudimentary thallus. He states in conclusion that he does not yet know the relationship of his organism to leprosy.

L. R.

FRIEDHEIM (Ernst A. H.). L'origine de la cellule lépreuse étudiée en culture de tissu. [**The Origin of the Lepra Cell studied in Cultures.**]—*C.R. Soc. Biol.* 1929. Jan. 25. Vol. 100. No. 3. pp. 163–165. [Pasteur Inst., Paris.]

This paper deals with attempts at tissue culture of rat leprosy material, in which the polymorphonuclear leucocytes died out, but the mononuclears developed into large leproma cells; this indicates their macrophage nature.

L. R.

i. ROSE (F. G.). **A New Method of Treatment of Leprotic Infection of the Nasal Mucosa.**—*Brit. Med. Jl.* 1929. Jan. 26. pp. 148–149. [1 ref.]

ii. ——. **The Treatment of Leprosy at the Mahaica Leper Hospital, British Guiana.**—*British Guiana Rep. Surgeon General for Year 1927.* Appendix B. pp. 66–70.

iii. MARNEFFE (H.). Influence du traitement par les éthers éthyliques de chaulmoogra sur la desquamation des éléments éruptifs de la lèpre. [**Effect of Treatment by Ethyl Esters of Chaulmoogra on Desquamation in Leprosy.**]—*Bull. Soc. Path. Exot.* 1928. Dec. 12. Vol. 21. No. 10. pp. 831–835.

iv. MARKIANOS (J.). L'alépol dans le traitement de la lèpre des rats. [**Alepol in the Treatment of Rat Leprosy.**]—*Ibid.* 1929. Jan. 9. Vol. 22. No. 1. pp. 17–19.

v. MARKIANOS (J.). L'alépol dans le traitement de la lèpre humaine. —*Ibid.* Mar. 13. Vol. 22. No. 3. pp. 155–156. [1 ref.]

i. This is an important paper in view of the danger of contagion from the nasal discharge of lepers, for Dr. Rose has found that by ionization of the infected nasal mucous membrane with 1 per cent. solutions of the sodium salts of *Hydnocarpus wightiana* oil, alepol (sodium hydnocarpate) or potassium iodide, the number of lepra bacilli in the nasal discharge is reduced in 10 to 14 days, and they often disappear altogether eliminating the infectiveness of many of the patients. A galvanic battery with small button electrodes wrapped in absorbent wool dipped in the solution is used. A current of 20 to 30 milliamperes for 20 to 30 minutes in each nostril separately was

used, and three or more sessions at two-week intervals were usually required to clear up the local infection; although unpleasant, the treatment is well borne even by children. Twenty-five patients were treated, including 13 in whom only nasal infection remained after general chaulmoogra derivatives treatment, and 19 have become negative to repeated microscopical examinations of the nasal mucus over two months, and in six more only very scanty organisms were occasionally found. Alepol was mainly relied on, but further observations are required to ascertain if the effects are permanent.

ii. Dr. Rose also reports on the work of the Mahaica Leper Asylum of British Guiana during 1927, where the daily average inmates numbered 294, and he estimates the total lepers in the colony at about 350, or 1·1 per mille of the population. A table of the lepers repatriated to India from 1906 to 1926 totals 268; an important factor in keeping down the numbers. At the end of 1927 the Institution contained 345 patients who were undergoing treatment, of which no less than 66 were considered as cured and had been conditionally discharged subject to periodic medical examination; a very good result of the modern treatment.

iii. The author reports his experience in the Hygiene Institute of French Guiana of treatment of lepers with chaulmoogra ethylesters intramuscularly, and he regards the reactions in the form of increased desquamation of macules and nodules as an indication of the efficacy of the drug and as a prelude to retrogression of the lesions with a favourable prognosis.

iv. Dr. Markianos reports on the treatment of rat leprosy with alepol, and he finds it has a definite influence in destroying the lepra cells with breaking down and elimination of the bacilli, which are not themselves destroyed.

v. The same worker reports on the use of alepol in two cases of human leprosy in Professor MARCHOUX's laboratory in Paris, and he concludes that it seems to exert a favourable action in some recent cases, but slow absorption makes intermissions of long usage advisable.

L. R.

SÜLK (N.). Vier geheilte Lepröse. [**Four Cured Lepers.**]—*Dermat. Woch.* 1929. Jan. 19. Vol. 88. No. 3. p. 99.

This brief paper records the treatment of two macular and two mixed cases of leprosy by a combination of Ol. Gynocardium, antileprol, CO_2 snow and solganal, on the lines advocated by PALDROCK, with promising results.

L. R.

OLPP. Die intravenöse Behandlung der Lepra mit Kalium jodatum und ihre Konsequenzen. [**The Intravenous Treatment of Leprosy with Potassium Iodide and its Consequences.**]—*Muench. Med. Woch.* 1929. Jan. 4. Vol. 76. No. 1. pp. 13–15. With 1 text fig. [19 refs.]

The author describes the technique of MUIR's potassium iodide treatment for leprosy, the reactions which it provokes and the precautions necessary in its employment. He considers it marks a great step forward, consequences of which have not yet been thought out.

These he discusses under three heads: Prophylaxis; employment in other diseased conditions; and legal questions. Under the first head he quotes the plan proposed by ROGERS and MUIR in 1925 for reducing the sources of infection to 20 per cent. in 5 years by examining all contacts of known cases for the early symptoms and treating those found to be infected. Besides the diseases already suggested, viz., bacillary or mycotic infections, diseases that are accompanied by the formation of granulation tissue, e.g., actinomycosis and articular (but not pulmonary) tuberculosis, the author also thinks chronic forms of psychoneuroses might be successfully treated with intravenous injections of potass. iodide. In some circumstances it might also be of use in ophthalmology. On the legal side he considers that sufficient proof has already been obtained of the effectiveness of the treatment to justify the abolition of compulsory isolation, and quotes the case of British Guiana. The hope of to-day is not in strict isolation of the leper, but in the widest publicity for the new successful methods of cure, so that patients will come forward voluntarily for treatment as out-patients or in their own homes.

L. R.

FUJIWARA (Akira). [Die Malariatherapie bei Leprakranken.] [**Malaria Therapy in Leprous Patients.**]—*Okayama-Igakkai Zasshi* (*Zent. d. Okayama Med. Gesellsch.*). 1928. Aug. Vol. 40. No. 8. pp. 1806–1811. [In Japanese. German summary p. 1812.] [Skin Clinic, Univ., Okayama.]

The author has observed the clinical course of therapeutic malaria in 12 lepers (6 cases of lepra maculosa, 3 of l. nervorum, 1 of l. tuberosa and 2 of l. mixta) for a period of 2–8 months after the inoculation. In this time the patients had 5–13 attacks of malaria.

A few cases improved somewhat after the lapse of 1–2 months from the onset of the attacks, both objectively as well as to some extent subjectively, but finally they got worse again. In one case of nodular leprosy the bacilli were demonstrable in very large numbers in the nodules 6 months after the malaria therapy. There is thus not much to be hoped for from the malaria therapy of leprosy.

The seroreaction of the lepers was not affected even when malarial blood showing a positive Wassermann reaction was injected.

L. R.

HASLÉ (Guy). Du chlorure de calcium intraveineux dans le traitement de la lèpre. [**Intravenous Chloride of Calcium in the Treatment of Leprosy.**]—*Bull. Soc. Path. Exot.* 1929. Jan. 9. Vol. 22. No. 1. pp. 11–17.

In Madagascar the author has used slowly administered intravenous injections of 150 cc. freshly prepared 2 per cent. pure calcium chloride in distilled water, in two series of 15 injections in one month with an interval of 15 days between the series, without any ill effects. Of 27 cases 11 were greatly improved, 11 improved, 4 slightly improved and 1 no effect. Macules lessened or cleared up, nodules decreased in size and became softer, ulcers rapidly healed in 15 out of 20 such cases, and glands became smaller. In nerve cases the neuralgic pains

were greatly relieved, but in no case did lost sensation return. In one case of opacity of the cornea sight was considerably improved. The general health was also beneficially affected, and this promising treatment can be combined with other methods.

L. R.

AUDRY (Ch.) & VIEV. Action du vaccin chancrelleux (Dmelcos) sur une lèpre tuberculeuse. [**Action of Dmelcos Vaccine on Nodular Leprosy.**]—*Bull. Soc. Française Dermat. et Syph.* 1928. May. No. 5. pp. 430–432.

The writer reports an advanced nodular case of leprosy treated with benefit by 12 capsules of chaulmoogra oil orally daily, together with eight intravenous injections, every fourth day, of dmelcos (Sicard's method) in doses gradually increased from 250 to 775 million bacilli. The latter produced violent congestion of the lesions of the face with serous exudation containing very numerous lepra bacilli, and these reactions are considered to have greatly aided the action of the chaulmoogra oil.

L. R.

JEANSELME (E.). A propos de la communication de MM. C. Audry et Vien [sic] sur l'action du Dmelcos chez un sujet atteint de lèpre tuberculeuse.—*Bull. Soc. Française Dermat. et Syph.* 1928. June. No. 6. p. 438.

A nodular leper with some nerve symptoms, who was given six intravenous injections in three weeks of "Dmelcos" in progressive doses of 225 to 675 millions, but without any benefit, in spite of temperature reactions up to 40·6° C.

L. R.

WILSON (R. M.). **Industrial Therapy and Leprosy.**—*China Med. Jl.* 1929. Jan. Vol. 43. No. 1. pp. 12–15. With 6 figs. on 4 plates.

This short paper describes and illustrates the work of lepers in building neat cottages for their residences, and also two-storied stone offices, etc., and the writer emphasizes the great importance of the exercise of such work in the successful treatment of leprosy in addition to drugs. The illustrations show in a striking manner the skill of the workers.

L. R.

EHARA (Ichiro). Eine neue Diagnostik der Lepra auf Grund der sero-elektrischen Reaktion. [**A New Diagnosis for Leprosy based on the Sero-Electric Reaction.**]—*Okayama-Igakkai Zasshi* (*Zent. d. Okayama Med. Gesellsch.*). 1928. Oct. Vol. 40. No. 10 (No. 465). German summary p. 2071. [In Japanese pp. 2067–2070. 4 refs.] [Skin Clinic, Univ., Okayama.]

The method is the same as in the author's herpes experiment (see same journal, Vol. 40, No. 7). The testicles of a rabbit that had been inoculated with the emulsion of the leprous nodule was removed 4 to 5 days after the inoculation and emulsified with 10 times the quantity of

absolute alcohol. The emulsion when used is diluted with 25-times the amount of physiological salt solution, and to it is then added a tenth of the quantity of inactivated patient's serum.

The method must be carefully followed according to the instructions of KOSAKA, SEKI and KUMAGAI. The particles of antigen migrate at a velocity of $3{\cdot}4\mu$ per second towards the anode. If normal serum or the serum of other patients is added to the antigen the velocity diminished to an average of $2{\cdot}61\mu$. On the other hand, leper serum decreases the velocity of the particles very considerably. A velocity of the particles less than $1{\cdot}8\mu$ per sec. is considered as a positive reaction for leprosy. The average of this velocity was $1{\cdot}37\mu$ per sec. 137 lepers confirmed these results. Syphilitics must always be excluded for they show a positive reaction. The reaction is exactly the same in lepra tuberosa, maculosa, nervorum and mixta. Also in cases greatly improved clinically as a result of treatment the reaction was still positive.

The antigen was produced directly from the emulsion of the leprous nodule or from the rabbit's testicle that had been injected with leprous blood, but the above-named antigen was best, and moreover, in that way a large quantity can be produced at once.

L. R.

BARBIER (Georges). A propos de deux nouveaux cas de lèpre. Vicissitudes du diagnostic.—*Bull. Soc. Française Dermat. et Syph.* 1929. Mar. No. 3. pp. 210–212. [1 ref.]

BEVIS (W. M.). Lepra Anaesthetica—an Isolated Case.—*U.S. Veterans' Bureau Med. Bull.* 1929. Apr. Vol. 5. No. 4. pp. 297–298. [U.S. Veterans' Hosp., Northport, N.Y.]

FRANCHINI (Giuseppe). Reproducción experimental de la lepra en el mono. (Segunda nota).—*Prensa Méd. Argentina.* 1929. Apr. 20. Vol. 15. No. 32. pp. 1423–1424. With 2 text figs. [1 ref.] [Inst. of Colonial Path., Univ., Bologna.] Italian version in *Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1928. Vol. 4. Nos. 28–31. pp. 16–19. With 2 text figs. [See this *Bulletin*, Vol. 26, p. 78.]

DA MATTA (Alfredo). Escorço historico da lepra no estado do Amazonas.—*Brasil-Medico.* 1929. Mar. 9. Vol. 43. No. 10. pp. 249–254. With 3 text figs.

——. Os symptomas iniciaes das leproses, seu contagio e evoluçao relativamente rapida.—*Brasil-Medico.* 1929. Mar. 16. Vol. 43. No. 11. pp. 277–287. With 5 text figs.

REMLINGER (P.). La lepra en Marruecos.—*Medicina Países Cálidos.* Madrid. 1929. Mar. Vol. 2. No. 2. pp. 122–126. [19 refs.]

CHOLERA.

TOMB (J. Walker). **The Incidence and Significance of Certain Clinical Signs in Cholera.**—*Far Eastern Assoc. Trop. Med. Trans. Seventh Congress, British India, 1927.* Vol. 1. pp. 37–38. [1 ref.]

This short paper deals with the clinical signs observed among 1,185 cases of cholera occurring in the Asansol Mining Settlement. In 70 per cent. intestinal cramps and abdominal pain are absent. Diarrhoea precedes vomiting in 96 per cent. of cases. Bloody stools occur in cholera in less than 3 per cent. of cases. They are of very favourable prognostic import.

When intestinal cramps and abdominal pain are present they are of somewhat unfavourable prognostic import.

J. H. Tull Walsh.

CORPUS (Teofilo). **Preliminary Report of the Value of investigating Diarrheal Diseases for Possible Cases of Cholera and the Necessity of instituting Prompt Measures.**—*Jl. Philippine Islands Med. Assoc.* 1929 Mar. Vol. 9. No. 3. pp. 106–108.

By immediate investigation of all diarrhoeal diseases, possible cases of cholera may be promptly detected, prompt sanitary measures instituted and other diarrhoeal diseases properly eliminated. Also by prompt detection of suspects the spread of the disease may be checked. From this preliminary study it is believed that "Cholera drops" [composition not given] will be of great value. Cholera vaccine should also be employed.

J. H. T. W.

BULLETINS FROM THE INSTITUTE FOR MEDICAL RESEARCH, FEDERATED MALAY STATES. 1928. No. 1. 12 pp.—**The Control and Treatment of Cholera in the Federated Malay States. A Compilation from Reports by Drs. E. H. Black, F. V. Jacques, W. Young, M. J. Graham, W. J. Vickers, E. C. Chitty, E. A. Struthers, M. P. O'Connor and Messrs. S. Danasamy, P. Ponnampalam, V. Thambar and E. S. R. Alfred on Cholera Outbreaks at the Quarantine Camp, Port Swettenham (1925, 1926) and in the State of Perak (1927).**

This Bulletin does not contain descriptions of any very novel features in the control and treatment of cholera. It is but a record of the work of the Federated Malay States Medical Department in the face of cholera epidemics. These notes have been prepared at the request of the Principal Medical Officer for the guidance of those medical men in Malaya who may come into contact with cholera for the first time. The brief sections deal with general sanitary measures, prophylaxis, complications, and treatment. Instructions are given for collecting and forwarding specimens for bacteriological examination.

J. H. T. W.

PEVERELLI (P.). De cholera te Batavia (II.). Enkele aanteekeningen betreffende beloop en epidemiologie. [**Cholera at Batavia (II.). Remarks on its Course and Epidemiology.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1928. Vol. 68. No. 7. pp. 953–972. [13 refs.]

Like the first part of this article the second covers mostly subjects dealt with in another paper in a more concise way (*ante* p. 85). A few points still deserve attention. Since 1918 no cholera had been seen at Batavia, though all suspicious cases have been subjected to careful examination; therefore the outbreak following the arrival of a cholera infected ship from Singapore makes it fairly certain that the epidemic originated there.

Vaccination met with very little resistance in the native population, which, on the contrary, seems to attribute to it various natural and supernatural blessings.

The improved water supply of Batavia may partly account for the town's freedom from cholera and for the light course of this epidemic in latter years.

W. J. Bais.

WOLTER (Friedrich). Die Hauptgrundgesetze der epidemiologischen Choleraforschung in ihrer Bedeutung für die Aetiologie der Cholera auf Grund einer vergleichend-epidemiologischen Betrachtung einer grösseren Reihe von Epidemien und mit besonderer Berücksichtigung des Choleraausbruchs in London, Golden Square (Broadstreetpumpe), im Jahre 1854. [**The Foundations of Cholera Research. Pettenkofer Memorial Essay.**]—*Pettenkofer-Gedenkschrift.* Munich. 1928. Vol. 8. No. 1. pp. 1–56. With 1 folding map. [Refs. in footnotes.]

The author deals with several outbreaks of cholera in the nineteenth century beginning with the London epidemic in Golden Square, 1854, which was traced to contaminated water in the Broad Street pump. He considers that the work of SNOW was the corner-stone of modern hygiene. Other early workers and other epidemics are alluded to; but the essay is in the main an appreciation of the work and theories of MAX VON PETTENKOFER. When PETTENKOFER set forth his theories of the causation of cholera, typhoid and other intestinal diseases he was a pioneer. His germ theory of cholera was confirmed by KOCH's discovery and isolation of the "common bacillus"—*V. cholerae.* A diagnostic table of the bacilli of the typhoid-coli group is given. This essay does not, of course, contain any new facts, but it is of great historical interest. [For an account of the life and work of MAX VON PETTENKOFER see this *Bulletin*, Vol. 24, p. 342 (HUME).]

J. H. T. W.

GANGULY (Lal Behary). **Present Day Treatment of Cholera.**—*Far Eastern Assoc. Trop. Med. Trans. Seventh Congress, British India, 1927.* Vol. 1. pp. 32–36.

The author states that about 1,000 cases of cholera are treated annually at the Campbell Hospital, Calcutta. These all come from the poorer classes, ill nourished and ill fed, often anaemic and cachectic,

steeped in an insanitary environment. They come at all stages of the disease, often 12 to 24 hours after the onset, and almost all in a state of profound collapse. Even amongst such a desperate lot of cases they get a recovery rate of fully 80 per cent. The treatment consists of judicious administration of saline transfusions given freely if the specific gravity of the blood is high—1064 or so—but if, in the presence of collapse, the specific gravity is moderate saline is given intravenously in small amounts. To check uraemia a strong solution of bicarbonate of soda 160 grs. with 60 grs. of sodium chloride to the pint is used. For treatment of serious cardio-vascular depression pituitrin and adrenalin have been extensively used, with atropine and caffeine for grave cardiac depression.

J. H. T. W.

HAHN (Martin) & HIRSCH (Julius). Die Enterotropie und die parenterale Wirkung des Choleragiftes. (III. Mitteilung.) [**Enterotropism, a Parenteral Action of Cholera Toxin.**]—*Klin. Woch.* 1928. Dec. 23. Vol. 7. No. 52. pp. 2483–2484. With 1 text fig. [2 refs.]

Intravenous injection of living cholera vibrios is known to produce a fatal diarrhoea in young rabbits, and smears made from blood, intestine and gall bladder give pure cultures of vibrios. Neither by oral feeding nor by injection of living vibrios into the intestine have the authors succeeded in producing an infection. Their experimentation has been on similar lines with cholera toxin instead of living vibrio and has had similar results. Thus intravenous injection of cholera toxin in young rabbits is followed within an hour by profuse diarrhoea and the death of the animals with depression of body temperature. These animals lose fluid to the extent of 10 to 17 per cent. of the body weight. Here also introduction of toxin by the mouth or directly into the small intestine is without effect. The action of the toxin on peristalsis is remarkable. An isolated loop of intestine, with a canula at either end and immersed in Tyrode solution, had toxin run through it without any effect on peristalsis. When, however, the toxin was added to the fluid in which the loop was suspended, so as to act on the external surface, it paralysed peristalsis. Cholera toxin then is inactive by enteral and active by parenteral administration.

W. F. Harvey.

HIRSCH (Julius). Der Stoffwechsel des *Vibrio cholerae* bei aerober und bei anaerober Züchtung. [**Metabolism of the Cholera Vibrio in Aerobic and Anaerobic Culture.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1928. Dec. 15. Vol. 109. No. 2. pp. 387–409. With 2 text figs. [Refs. in footnotes.] [Hyg. Inst., Univ., Berlin.]

Investigation on this subject has already been published by the author (see this *Bulletin*, 1927, p. 45).

The results obtained are: (1) Obligatory aerobic growth upon a carbohydrate-free amino-acid medium, as in peptone solutions, is dependent entirely upon the chemical composition of the substrate and is not a specific peculiarity of the organism. (2) The cholera vibrio can grow under strict anaerobic conditions as soon as carbo-

hydrate, to furnish an anoxybiotic source of energy, is added to the medium. (3) Carbohydrates are preferred as a source of energy to amino-acids both under aerobic and anaerobic conditions. (4) Amino-acids are chiefly important in sugar containing media as sources of nitrogen. (5) Under anaerobic conditions, with carbohydrate present, a slight de-aminization of aspartic acid gives one molecule of ammonia and succinic acid. (6) Under aerobic conditions a smaller part of the sugar undergoing decomposition is burnt ; the greater part is fermented. (7) The anoxybiotic splitting of the glucose by the cholera vibrio does not proceed in one way only. Two types of independent reaction are shown, the one in which lactic acid is produced and the other in which formic acid, acetic acid and ethyl alcohol are produced.

The important conclusion is arrived at that the obligate aerobic growth of the cholera vibrio, as it occurs in peptone water, does not represent its natural mode of growth in the infected intestine, but that this corresponds to anaerobic growth in a glucose containing medium. Detailed methods of investigation of these points are described in an appendix.

W. F. Harvey.

FUJIMORI (K.). Ueber den biologischen Unterschied zwischen dem nativen und dem gekochten, in Wasser gelösten mikrobiotischen Antigen von Choleravibrionen. I. Mitteilung: Ueber den Unterschied bei Erzeugung des Agglutinins und Bakteriolysins. [**Difference in Action between Heated and Unheated Cholera Antigen. I. In Respect of Production of Agglutinins and Bacteriolysins.**]—*Cent. f. Bakt.* I. Abt. Orig. 1929. Feb. 16. Vol. 111. No. 1/3. pp. 68–83. With 10 text figs. [6 refs.] [Surg. Clinic, Imperial Univ., Kyoto.]

The test materials of this research were: (1) A cholera vaccine containing 0·0007 cc. of bacterial substance per cc. ; (2) a filtrate through a bacterial candle of a 24-hr. bouillon culture which had been kept for 5 days in an ice chest. This filtrate was used unheated and after heating for 20, 60, and 120 minutes at 100° C. Differences of immunizing action between these materials, singly or in combination, are explained on the basis of the "impedin" theory. The results obtained are given as :—

(1) Immunization success, as gauged by production of agglutinins and bacteriolysins, showed that vaccine alone was equal in efficacy to vaccine in combination with unheated filtrate and that both of these were progressively less and less efficacious than vaccine with bouillon, vaccine with filtrate heated at 120° C., vaccine with filtrate heated at 60° C. and vaccine with filtrate heated at 20° C. (2) The minimum lethal doses of vaccine, unheated filtrate and heated filtrates were 6 cc., 12 cc. and 17 to 18 cc. respectively: it was in this serial order that, when used in doses of $\frac{1}{2}$ and 1–20th minimum lethal dose, they gave rise to degrees of hypoleucocytosis or hyperleucocytosis. Hypoleucocytosis for the larger dosage and hyperleucocytosis for the smaller may be taken as measures of toxicity. (3) Since the combination vaccine with unheated filtrate gives rise practically to the same variations in the leucocyte count as vaccine with filtrate heated for 20 minutes, it follows that the better immunization success obtained with heated filtrate can not depend upon its toxicity component, but

must be referred to antigenic capacity. This greater antigenic capacity must be due in the first place to the great thermostability of the antigenic substances, and, secondly, to the inactivation by heat of the "impedin" contained in the unheated filtrate.

"Impedin" is regarded as combined with bacterial protein and as exercising an inhibitory influence upon antigenic activity; it is more thermostable than bacterial toxin, but less so than antigenic substance.

W. F. Harvey.

FUJIMORI (K.). Ueber den biologischen Unterschied zwischen dem nativen und dem gekochten in Wasser gelösten mikrobiotischen Antigen von Choleravibrionen. II. Mitteilung: Ueber die Impedinerscheinung der spontanen Phagozytose. [**Difference in Action of Heated and Unheated Cholera Antigen. II. The Impedin Phenomenon and Spontaneous Phagocytosis.**]—*Zent. f. Bakt.* I. Abt. Orig. 1929. May 10. Vol. 112. No. 1/2. pp. 11–16. With 3 text figs. [7 refs.] [Surg. Clinic, Imperial Univ., Kyoto.]

In the first communication (above) this subject was treated from the point of view of production of agglutinins and bacteriolysins by cholera vaccine in conjunction with heated and unheated filtrates of cholera cultures. This second communication deals with the identical results obtained in respect of the spontaneous phagocytosis of staphylococci, occurring upon injection into the circulation of staphylococcus suspension along with cholera filtrate. In this set of experiments the greatest phagocytosis was obtained in the case of mixture of suspension with filtrate heated for 20 minutes at 100° C. and less and less phagocytosis from mixtures with filtrate heated for 60 minutes, 120 minutes, and unheated respectively. The same argument is used as before, that this difference is not due to the relative toxicity of the filtrates, seeing that, when injected, they evoke much the same degree of leucocytosis, but is due to the presence of a comparatively thermolabile "impedin" or inhibitory substance in the unheated filtrate. With minuter examination of effects, it is found the unheated filtrate gives rise to a somewhat greater total leucocytosis, while filtrate heated for 20 minutes gives a greater percentage polymorph leucocytosis.

W. F. Harvey.

TORIKATA (R.) & UYEDA (O.). Experimenteller Vergleich des Nativimmunogens mit dem Koktoimmunogen von Choleravibrionen unter besonderer Berücksichtigung der Toxizität und der immunisatorischen Erfolge. [**Comparison of Unheated and Heated Cholera Antigens with Special Reference to their Toxicity and their Immunizing Power.**]—*Zent. f. Bakt.* I. Abt. Orig. 1929. May 10. Vol. 112. No. 1/2. pp. 91–108. [Refs. in footnotes.] [Torikata Inst. for Immunity Research, Osaka.]

Seven-day bouillon cultures of cholera vibrio were carbolized at 0·5 per cent., left for 3 days at room temperature, and then centrifuged at high speed. The clear supernatant fluid was used as unheated "filtrate" and the carbolized unheated culture as unheated "vaccine."

Heated antigen was obtained by heating the bouillon culture for 20 minutes at 100° C. and then carbolizing at 0·5 per cent. The heated "filtrate" and heated "vaccine" were then prepared in the same way as the unheated antigens. Experiments with these preparations showed that: (1) Heated antigen produced, *ceteris paribus*, a larger precipitate than unheated; (2) the minimum lethal doses of the unheated antigens were smaller than those of the heated antigens; (3) unheated filtrate and vaccine produced a greater quantity of agglutinin and bacteriolysin in the blood than heated filtrate and heated vaccine if administered in equal cc. doses; (4) if, however, these antigens were administered not in equal doses, but in doses of an equal degree of toxicity (1-5 or 1-10th lethal dose), then the heated antigens produced a greater quantity of agglutinins and bacteriolysins than the unheated; (5) the assessment of antigenic capacity by means of the *in vitro* tests of precipitation and complement fixation altogether leave out of account the toxicity of the antigen. The *in vitro* result is brought into line with *in vivo* effect, if the antigen in the latter case is injected in doses of equal toxicity.

W. F. Harvey.

MARRAS (F. M.). Sulle emolisine dei Vibrioni colerigeni. [**The Haemolysin of the Cholera Vibrio.**]—*Ann. d'Igiene.* 1929. Apr. Vol. 39. No. 4. pp. 249–254. [5 refs.]

The technique used was to mix 1 cc. of the filtrate of a 72-hour culture in peptone water with 1 cc. of a 2½ per cent. suspension of sheep erythrocytes. The test tubes were kept in the incubator at 37° C. for 4 hours and in the ice chest for 24 hours. Strains freshly isolated from cholera cases in Calcutta were found to be haemolytic. The haemolytic power was not related to agglutinability nor to the cholera red reaction. Some of the strains, isolated in Calcutta and possessed of haemolytic character, were found to be deprived of this character some months later. The author concludes that presence or absence of haemolytic power is not a criterion by which to differentiate cholera from non-cholera vibrios.

W. F. Harvey.

URBAIN (Achille). Infection cholérique expérimentale par la voie intra-rachidienne. Essai de vaccination locale de la cavité méningée contre le vibrion cholérique. [**Experimental Cholera by the Intraspinal Route. Local Vaccination of the Meningeal Space.**]—*C.R. Soc. Biol.* 1929. Apr. 19. Vol. 100. No. 12. pp. 991–994. [3 refs.]

The strain of *V. cholerae* used was not highly virulent. It produced in the rabbit, on intravenous injection of 1–10th agar culture, paralysis and diarrhoea in 3 to 4 days and death on the 5th or 6th day. But the same weak strain, when injected subdurally through the occipito-atloid ligament in a dose of only 1–8,000 to 1–12,000th of an agar culture gave rise to a cholera septicaemia and either death in 24 hours or severe meningo-encephalitis. Once the minimum lethal dose was established, experiments were done to test the possibility of effecting local immunization by means of cholera "antivirus." Thus, for example,

a rabbit of 2,000 gm. received intraspinally 0·5 cc. of cholera antivirus. On the following day this animal and a control were inoculated by the same route with 1–5,000th agar cholera culture. The control animal died of cholera septicaemia in 36 hours while the immunized animal survived. This is a case of specific immunization, for neither other antiviruses nor ordinary bouillon afford any such protection.

W. F. Harvey.

SOUCHARD (L.). Fonctionnement du laboratoire des vaccins à l'Institut Pasteur de Saigon au cours de la campagne anticholérique 1927–1928. [**Large-scale Manufacture of Anticholera Vaccine at the Pasteur Institute, Saigon.**]—*Arch. Inst. Pasteur d'Indochine.* 1928. Oct. No. 8. pp. 23–39. With 2 graphs, 1 plan & 6 figs. on 3 plates.

This is a detailed account of how great difficulties were successfully surmounted in reorganizing the vaccine department of the Pasteur Institute at Saigon. It was able in less than 3 months to cope with a demand for cholera vaccine which represented a 100-fold increase on the original annual outturn.

W. F. Harvey.

PEVERELLI (P.). **Cholera in Batavia. Some Notes concerning its Progress and Epidemiology.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1928. Vol. 17. Pt. 4. pp. 594–622. With 2 diagrams. [13 refs.] [Med. Lab., Weltevreden.]

——. De cholera te Batavia (I.). Enkele aanteekeningen betreffende beloop en epidemiologie. [Cholera at Batavia (I.). Some Notes on its Course and Epidemiology.]—*Geneesk Tijdschr. v. Nederl.-Indië.* 1928. Vol. 68. No. 5. pp. 666–680.

These papers do not differ in essential matters from the paper already summarized in this *Bulletin, ante,* p. 85.

J. H. T. W.

ANDO (K.). On the Outbreak of Cholera on Board S.S. "Hawaii Maru" and the Persistence of *V. cholerae* in the Stools of Contacts.—*Japan Med. World.* 1928. Oct. 15. Vol. 8. No. 10. pp. 268–270.

PALMER (F. J.). Investigations in Sporadic Cholera, 1928.—*Jl. Trop. Med. & Hyg.* 1929. Apr. 1. Vol. 32. No. 7. pp. 93–97.

PLAGUE.

ROGERS (Leonard). **The Yearly Variations in Plague in India in Relation to Climate: Forecasting Epidemics.**—*Proc. Roy. Soc.* Ser. B. 1928. May 1. Vol. 103. No. 721. pp. 42–72. With 1 map in text & 4 folding plates. [7 refs.] [Summary appears also in *Bulletin of Hygiene.*]

Plague in India has a definite annual seasonal incidence in the same area, although the months of maximum prevalence vary in different provinces. In this study of plague incidence in relation to climate it is shown that the seasonal incidence in different areas of India may be explained by the seasonal variations in the mean temperature and humidities (the latter expressed as saturation deficiencies). They appear to act through their influence on the life of the rat fleas, which convey the infection to man.

The mean monthly temperature variations in the hot weather and monsoon periods influence the subsequent plague incidence by high temperatures reducing and low ones favouring the prevalence of the disease.

The saturation deficiencies, both in the two hot seasons and in the early and late cold weather ones, influence the incidence of plague; low saturation deficiencies appear to be favourable and high saturation deficiencies unfavourable to the disease. For the three northern plague areas of the Punjab, the United Provinces and Bihar the author considers it is possible to forecast to a large extent the more important yearly increases and decreases of the disease from a knowledge of the variations in these climatic factors.

In the Deccan area of Bombay, with an early monsoon increase of plague and but slight yearly hot season temperature variations, the yearly variations in plague are more dependent on the saturation deficiencies during the plague season, so forecasts are of less value. [*v.* this *Bulletin*, Vol. 25, p. 315 (DOORENBOS); p. 317 (FORSTER)].

H. M. Woods.

DUFFAU & LALLEMENT. Considérations sur une épidémie de peste à Oran. [**Plague in Oran.**]—*Bull. Soc. Path. Exot.* 1929. Mar. 13. Vol. 22. No. 3. pp. 193–200. [Oran Hosp., Oran, Algeria.]

This outbreak presents the usual features. Most of the cases were bubonic plague, but septicæmic plague occurred in two cases, and a focus of pneumonic plague was found among two closely related families. Anti-plague vaccination was practised from the start, and 3,327 persons were protected. Thanks to this and the sanitary measures taken, the epidemic was suppressed in about a month.

J. H. Tull Walsh.

MARINO (Vincenzo). Note ed osservazioni su un episodio di peste bubbonica. [**Bubonic Plague.**]—*Policlinico.* Sez. Prat. 1929. Jan. 21. Vol. 36. No. 3. pp. 77–81.

Under the direction of the Director General of Public Health the author had the opportunity of observing a small outbreak of bubonic plague in Tripolitania, where plague is not endemic and is not often

seen. Of 36 cases 12 died and the epidemic was over in a month. The actual cause was not traced and there was no plague among the rats that were killed and examined. The author suggests that healthy human carriers might have introduced the disease [this *Bulletin*, Vol. 24, p. 34 (LEGER) ; p. 933 (NIKANOROW)].

J. H. T. W.

MEIHUIZEN (F. H.). Een kleine Pestepidemie. [**A Small Epidemic of Plague.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Jan. 21. Vol. 69. No. 1. pp. 60–62.

In about a week's time 5 members of a Chinese family at Poerwokerto (Java) and 2 of their Javanese servants died from an acute febrile disease, with rapid and serious involvement of the heart's action. One of the servants had returned sick from Boemiajoe, where plague was prevalent at that time. The author saw the last 2 of these 7 cases, and, suspicious of plague, made a puncture of the spleen of the last patient after death ; the examination of the spleen juice, however, yielded negative results. The diagnosis was only established when after four days the Amboinese nurse, who attended the last patient, developed pulmonary plague, ending fatally in 5 days and confirmed by bacteriological finding of the plague bacillus. Apparently no further cases occurred.

In view of the fatal course of all the cases the author's therapeutical suggestions appear hardly worth mentioning.

W. J. Bais.

TSUCHIYA (K.) & CHUAN (Li Te). [**On Pest Epidemic at Chienchiatien, Inner-Mongolia.**]—*Jl. Oriental Med.* 1929. Mar. Vol. 10. No. 3. [In Japanese. English summary pp. 33–37. 4 refs.] Hyg. Inst. of S. Manchuria Rly. Co., Dairen.]

The epidemic described in this paper lasted from the end ten days of August to the middle of November, 1928. The population of Chienchiatien was about 1,300 and 400 cases of bubonic plague occurred. Mortality, 97·4 per cent. As is generally the case in Mongolia and other parts of China, buboes were very common in the cervical, submaxillary and axillary glands.

J. H. T. W.

G SSNER (Francis E.). **Report of a Case of Plague.**—*Milit. Surgeon.* 1929. Jan. Vol. 64. No. 1. pp. 95–97.

The case was that of an enlisted man on duty in the C.M.T. camp at Del Monte, California. No history was obtainable from the patient as he was unconscious on admission, July 26th, 1928, He died at 8 p.m., July 27th. The left inguinal glands were enlarged. When the case was reported the County Health Officer stated that there had been epizoötic plague among the ground squirrels about eight miles from the camp, and later investigations indicated that plague existed among squirrels within the camp area. The camp was closed on July 29th. The regular troops were returned to their proper stations and the C.M.T.C. students were sent to their homes. Following the death from plague at Camp Del Monte, a survey was made of the National Guard camp area at San Luis Obispo, where 20 per cent. of the ground squirrels were found to be infected. Eradication measures were promptly instituted and no human cases developed in the camp.

J. H. T. W.

HEMPHILL (R.). **Notes on a Case of Plague in Aden.**—*Jl. Roy. Army Med. Corps.* 1928. Nov. Vol. 41. No. 5. pp. 374–376. With 1 chart in text.

During a serious outbreak of plague in Aden, from January until May, 1928, 1,494 cases were recorded among the native population, with 1,107 deaths. Only one case occurred in the British garrison, the whole of which was protected by inoculation with Haffkine's anti-plague vaccine, shortly after the commencement of the epidemic. This case is reported in detail. It was a severe case with high temperature, delirium and buboes, which were opened and drained. On the fifth day an intravenous injection of 20·0 cc. of a 1 per cent. solution of mercurochrome was administered and amelioration of symptoms followed. The buboes healed and the soldier made a good recovery.

J. H. T. W.

i. URIARTE (Leopoldo) & MORALES VILLAZÓN (N.). La profilaxis contra la peste bubónica. Un decenio de investigaciones en las ratas. [**Prevention of Bubonic Plague.**]—*Rev. Inst. Bacteriológ.* Buenos Aires. 1928. Mar. Vol. 5. No. 2. pp. 149–175. Annexure pp. 181–197. With 7 figs. & 2 plates. [5 refs.] English summary pp. 177–179.

ii. ——. Sobre profilaxis antipestosa y "rat-proof." [**"Rat-Proof" Prevention.**]—*Ibid.* pp. 198–213. With 1 plan, 1 coloured plate & 39 figs. English summary pp. 214–215.

i. The paper describes the well-known methods by which the plague infection is spread. In the Argentine the centres of bubonic plague have always originated by direct contagion from rats or by handling goods contaminated by rats. Since 1914 there has existed in the Port of Buenos Aires a service of deratization depending on the National Bureau of Hygiene. The rats which are captured daily, due precautions being taken against contagion, are sent to the Plague Section of the Bacteriological Institute and examined every day. This paper refers to observations made from 1916 to 1926. The usual pathological signs were generally found; but it was shown that rats without any evident marks of disease were bearers of virulent *Pasteurella pestis.* It was always necessary to confirm the autopsy by bacteriological examination. During the years covered by these investigations epizoötics have been very rare in the Port of Buenos Aires.

ii. This paper advocates prevention of plague by making buildings "rat-proof," especially all buildings used for storage of food and grain. Plans and drawings are given of a specially designed rat-proof building for storage of grain, etc.

J. H. T. W.

PHILLIPS (W.). Les risques actuels de diffusion de la peste dans la Chine du Nord. [**Spread of Plague Risks in N. China.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. Dec. Vol. 20. No. 12. pp. 1948–1950.

The author is Medical Officer to the British Consulate at Newchwang. He notes that the marmots of Eastern Mongolia and Transbaikalia form a permanent reservoir for plague, especially the tarabagan trapped for the sake of the skins. Every year plague appears. Generally the

epidemics are localized ; some trappers die or a village may be exterminated ; but owing to isolation by distance and difficulty of communications the disease remains localized. With the building of railways the situation is changed. Plague will spread more rapidly, especially that most fatal form pneumonic plague, which passes direct from man to man. The author calls upon the Chinese authorities to make arrangements for inspection of railways and for prevention of risk of transmission of plague.

J. H. T. W.

SYSSINE (A.). La peste en Transbaïkalie et l'organisation antipesteuse transbaïkalienne. [**Plague in Transbaikalia and the Organization to combat it.**]—*Bull. Office. Internat. d' Hyg. Publique.* 1928. Oct. Vol. 20. No. 10. pp. 1604–1608. With 1 map. [2 refs.]

Plague habitually appears in Transbaïkalia every year. The outbreaks are small and often quite isolated. The one exception was 1910, when there were 44,000 victims. A table is given showing the number of cases from 1919 to 1928. They vary from two in 1919 to 57 in 1921. The source of infection is generally the tarabagan. During the years of civil war the anti-plague organization was abolished, but it was reconstituted in 1923 and now consists of : a laboratory at Chita ; a travelling detachment possessing a laboratory wagon and four other wagons, and a medical plague station at Borzia. In 1924 an anti-plague laboratory was established in the bacteriological institute at Irkutsk.

J. H. T. W.

FIALHO (Amadeu). Estudos sobre a peste. Primeira Nota. Qual a sobrevivencia dos bacillos pestosos nas cobayas inoculadas experimentalmente ? [**Studies in Plague.**]—*Archivos de Hyg.* Rio de Janeiro. 1928. May. Vol. 2. No. 1. pp. 19–26. English summary facing p. 26.

This paper consists of experiments on guineapigs. They were infected by rubbing the organs of plague animals into the shaven skin. At temperatures between 20·8° and 23·8° C. plague bacilli were isolated from the bodies of the infected guineapigs until the third day after death.

J. H. T. W.

GIRARD (G.). L'enseignement de l'hémoculture dans la peste pulmonaire primitive de Madagascar. [**Haemoculture in Primary Pneumonic Plague.**]—*Bull. Soc. Path. Exot.* 1929. Apr. 10. Vol. 22. No. 4. pp. 234–239. [4 refs.] [Pasteur Inst., Antanarivo.]

The author describes twelve cases of primary pneumonic plague treated at Antanarivo in 1927 and 1928. In seven the results of haemoculture were negative, in five positive. All the patients died. Contacts were examined by the method of blood culture, but the plague bacillus was never found. In all the cases bacilli were found in the sputum.

J. H. T. W.

BICHKOV (V.) & BORZENKOV (A.). [**On the Determination of Plague-Infected Fleas by the Method of Preparation and Seeding of the Isolated Alimentary Canal.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1929. Vol. 8. No. 1. pp. 20–32. With 14 text figs. [14 refs.] [In Russian. English summary pp. 112–113.] [Anti-Plague Lab., Stalingrad.]

The fleas are treated for one minute with 96 per cent. alcohol, which is then washed off with normal salt solution. A tear is made in the chitin integument of the body, the head and oesophagus separated with a needle, the posterior part of the insect cut off and the stomach removed through the anterior part of the body. Examination of the blocked proventriculus of a plague-infected flea shows that it has an enlarged dark lumen and atonic walls instead of walls with normal alveolar structure. The contents of 60 to 70 of these stomachs may be made into a suspension and sown on a nutrient medium, by which means a culture test may be applied to large numbers of fleas for the detection of plague infection. If by this means blocked fleas are detected in any locality, this shows that an epizootic of plague has been in existence there. Fleas can act in the intervals between epidemics as reservoirs of plague.

W. F. Harvey.

SKORODUMOW (A.). [Ueber den Einfluss des Gefrierens und Tauens auf das Wachstum und die Virulenz des Pestmicroben.] [**Influence of Frost and Thaw on the Growth and Virulence of Plague Organisms.**]—*Rev. Microbiol. et Epidémiol.* 1928. Vol. 7. No. 3. pp. 280–284. With 1 chart in text. [In Russian. German summary p. 339]. [Bact. Inst., Irkutsk.]

The conditions were those naturally prevailing during winter in Irkutsk and the cultures investigated were obtained from dead guinea-pigs. Sometimes plague cultures could not be obtained; sometimes they were enhanced in virulence and sometimes diminished. With artificial temperature variation up to 45° C. it was found that some cultures lost not only their virulence, but also their capacity for growth, while others preserved both of these.

W. F. Harvey.

BEZSONOVA (A.). [**On Two Variations of *B. pestis* in Relation to Glycerin.**]—*Rev. Microbiol. et Epidémiol.* 1928. Vol. 7. No. 3. pp. 250–253. [7 refs.] [In Russian. English summary pp. 336–337.] [State Inst. of Microbiol. & Epidemiol. for S.-E. of U.S.S.R.]

The strains of *Past. pestis* examined were 145 Russian from various sources and 4 obtained from outside Russia. All the Russian strains fermented glycerin and all the foreign strains failed to do so. Nor did continued subculture on glycerin medium effect any alteration in these characters. Fermentation of glycerin by *Past. pseudotuberculosis rodentium* is supposed to be a character distinguishing it from *Past. pestis*, but this research negatives its utility for this purpose.

W. F. Harvey.

BERDNIKOV (V.). [**On the Influence of Fixation and Staining on the Vitality of Plague Bacillus.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1929. Vol. 8. No. 1. pp. 33–39. [In Russian. English summary pp. 113–114.]

Fixation of smears in the flame (4 or 5 times), in ethyl alcohol (up to 2 minutes) or in alcohol-ether mixture, either do not kill or are uncertain of result. On the other hand, fixation with ethyl alcohol (30 secs.) and subsequent burning off the alcohol or fixation in methyl alcohol (10–15 secs.) almost invariably kills the plague bacillus. Ziehl's fuchsin (1 : 10) is more lethal than Loeffler's methylene blue and may kill the plague bacillus in unfixed smears within a minute.

W. F. Harvey.

FLU (P. C.). Immunisation des rats blancs et des cobayes contre la peste expérimentale au moyen d'un extrait aqueux de bacilles pesteux virulents. [**Immunization of White Rats with Aqueous Extracts of Virulent Plague Bacilli.**]—*C.R. Soc. Biol.* 1929. Apr. 8. Vol. 100. No. 11. pp. 835–837.

——. Immunisation des rats blancs contre la peste expérimentale au moyen des bacilles pesteux virulents lysés, en suspension concentrée, par des bactériophages antipesteux. [**Immunization of White Rats with Plague Bacilli lysed by Anti-Plague Bacteriophage.**]—*Ibid.* pp. 837–838. [1 ref.] [Trop. Inst., Univ., Leyden.]

In the first of these papers there are given the results obtained with subcutaneous injection of aqueous extracts of plague bacilli in white rats. Thirty rats were used, nine died in the course of a 3-dose treatment and the 21 remaining rats survived, 3 weeks after their last prophylactic injection, an inoculation of 100 times the lethal dose of living plague bacilli. The great objection to this procedure is the reaction caused.

In the second paper a different type of vaccine was employed, which was prepared as follows :—

Bouillon of pH 7·6 was sown with 1·3 billion plague bacilli per cc. from a 24-hour culture and then with 0·2 cc. of a very active antiplague bacteriophage per 10 cc. bouillon. If lysis had not taken place in this mixture after 6 hours at 30° C. an additional 0·1 cc. bacteriophage per 10 cc. bouillon were added. Incubation was for 12 hours at 30° C., after which phenol was added to a strength of 0·5 per cent. This vaccine was then heated for 4 hours at 44° C. and left at room temperature for 5 days.

Three subcutaneous injections 0·5, 1 and 1·5 cc. were given at intervals of 4 or 5 days. The results were that 91·2 per cent. of rats were immunized against 40 lethal doses and 26·3 per cent. against 400 lethal doses. The control animals all succumbed on test. Local and general reactions were absent with this vaccine.

W. F. Harvey.

HAUDUROY (Paul) & GHALIB (Ali). Présence du bactériophage antipesteux à Paris. [**Antiplague Bacteriophage in Paris.**]—*C.R. Soc. Biol.* 1929. Apr. 26. Vol. 100. No. 13. pp. 1085–1086.

Eleven sewer rats were examined. Suspensions were made of the triturated organs, blood and faeces and these were filtered separately.

In the blood and the faeces of only one of these rats was a plague bacteriophage found, lysing a bouillon culture in 10 to 12 hours, furnishing clear plaques on agar and transmitting its activity in series. The potency of the bacteriophage increased with passage. Filtrates of cultures gave rise in certain cases to secondary cultures, thus confirming the existence of a filtrable form of *Past. pestis.*

W. F. Harvey.

COMPTON (Arthur). **Sensitization and Immunization with Bacteriophage in Experimental Plague.**—*Jl. Infect. Dis.* 1928. Nov. Vol. 43. No. 5. pp. 448–457. With 1 text fig. [8 refs.] [Public Health Labs., Alexandria Municipality, Egypt.]

These experiments were carried out with a strain of bacteriophage which was not one of maximum virulence; otherwise the results might have been better. Maximum virulence for phage is defined as ability to lyse completely in 4 to 5 hours at 37° C. a 1 to 2 thousand million suspension of *Past. pestis* in broth.

One experiment on mice was made to test the therapeutic effects of phage after infection and failed to show any curative effect. In the second experiment 6 mice were used, three phage inoculated and three controls, with test dose of plague 4 days later. The inoculated animals died on the 2nd, 4th and 9th day and the controls on the 3rd, 3rd and 4th days. A third experiment in prophylaxis used 15 mice, in groups of 5, 6 and 4 for phage inoculated, vaccine inoculated and control respectively. All of these died except two which survived in the phage group. The author considers the results promising for phage prophylaxis and forestalls criticism of his paucity of numbers by stating that this study of immunity " will require to be worked out still more fully and confirmed on a much larger scale before being finally accepted."

W. F. Harvey.

BOQUET (A.) & DUJARDIN-BEAUMETZ (Ed.). Sur les relations entre le bacille de la peste et le bacille de la pseudo-tuberculose des rongeurs. [**Relationship between the Plague Bacillus and the Pseudotuberculous Bacillus of Rodents.**]—*C.R. Soc. Biol.* 1929. Mar. 8. Vol. 100. No. 9. pp. 625–627.

The subject of the identity of these organisms has received much attention of late. Serological experiments by the authors, relating to precipitins, agglutinins and complement fixation with the sera of the sheep and the fowl point in general to a close antigenic relationship with some differences. Protection experiments likewise give indication of this relationship. Thus sterile suspensions of *Past. pseudotuberculosis,* injected subcutaneously, immunized 6 guineapigs out of 10 against a test dose of the same organism which proved fatal for the controls in 5 days. MACCONKEY had shown that guineapigs immunized to *Past. pseudotuberculosis* were equally resistant (10 out of 12) to subcutaneous inoculation of *Past. pestis.* On the other hand, guineapigs which have been immunized successfully to plague are not then immune to infection by the pseudotuberculosis bacillus. The conclusion is reached that, if these two organisms possess common antigenic characters, the *Past. pseudotuberculosis* is more active than the plague bacillus in the

production of antibodies and confers a more efficacious immunity upon the guineapig against them both. These facts have been made the basis for the use of a pseudotuberculosis vaccine as a plague prophylactic in Madagascar with apparently good results in the villages where it was used as compared with surrounding villages.

W. F. Harvey.

ZLATOGOROV (S.) & MOGILEVSKAYA (B.). [**On Composition of Cultures of** *B. pseudotuberculosis rodentium*, **their Variation and Affinity with** *B. pestis*.]—*Rev. Microbiol. et Epidémiol.* 1928. Vol. 7. No. 3. pp. 264–279. With 8 text figs. [19 refs.] [In Russian. English summary p. 338].

Cultures of *Past. pseudotuberculosis rodentium* dissociate into smooth and rough colony forms with all degrees of transition between them. The smooth colonies show affinities which are very close to those of *Past. pestis* and are distinguished from the rough type morphologically, biochemically and biologically. These smooth culture organisms are highly virulent. The rough types are much less virulent and present the characters of *Past. pseudotuberculosis rodentium*. These facts will necessitate a reconstruction of ideas on the epidemiology of plague, plague vaccination and the destruction of rodents in plague areas.

W. F. Harvey.

ZLATOGOROFF (S. I.) & MOGHILEWSKAJA (B. I.). Constitution des cultures du *B. pseudotuberculosis rodentium*, leur variabilité et leur parenté avec le *B. pestis*. [**Cultures of** *B. pseudotuberculosis rodentium*, **their Variability and Relation to** *Past. pestis*.]—*Ann. Inst. Pasteur.* 1928. Dec. Vol. 42. No. 12. pp. 1615–1634. With 4 text figs. [19 refs.] [Sanit. Bact. Inst., Kharkov.]

Differentiation of cultures of *Past. pseudotuberculosis rodentium* from those of *Past. pestis* has always occasioned difficulty. It is the characters of rough and smooth colonies of the pseudotuberculosis organism which are here studied. All transitions between the extreme types of colony were found and the diversity of forms seemed to depend on the quantity of peptone contained in the medium. Different brands of peptone gave different results. With Merck's peptone they were almost all smooth in type and with Witte's almost all rough. The organisms of smooth colonies are short and show bipolar staining while those of rough colonies are longer and large. OTTEN's experiments for the differentiation of pseudotuberculosis and plague were applied to rough and smooth colonies of the former. In a 0·5 per cent. peptone water containing 0·05 per cent. glucose the pseudotuberculosis organism should, in 3 to 7 days, produce increase of pH of the culture while plague should lower it. The same order of changes were found with rough and smooth pseudotuberculosis cultures and the smooth types were those which resembled plague cultures. In virulence again, the smooth colonies, like plague, have the greater virulence. Complement fixation experiments showed that the receptor constitution of these two types of colony exhibits well marked differentiation. All these facts point to a close relationship, amounting, indeed, to identity, between smooth colonies of *Past. pseudotuberculosis rodentium* and *Past. pestis*.

W. F. Harvey.

LENSKAYA (G.). [**On the Question of Morphological Variety of** *B. psdtbc. rod.* **Pfeiffer and** *B. pestis.*]—*Rev. Microbiol. et Epidémiol.* 1928. Vol. 7. No. 3. pp. 254–263. With 20 text figs. 9 refs.] [In Russian. English summary pp. 337–338.] [State Inst. of Microbiol. & Epidemiol. for S.-E. of U.S.S.R.]

Three strains of *Past. pseudotuberculosis rodentium* and one strain of *Past. pestis* showed atypical forms in smears. These were coarse, thick, twining, unevenly stained filaments and frequently appeared to branch. With subculture the plague strain and two of the pseudotuberculosis strains reverted to typical forms. The strain of pseudotuberculosis which did not revert, maintained its character even after subpassage in the guineapig. The atypical forms were obtained both from atypical and almost typical colonies on agar. These colonies were coarse, pleated, alveolar, net like, etc., but never smooth and corresponded to HADLEY'S " R " type.

W. F. Harvey.

i. SEMIKOZ (F.) & LOKHOV (M.). [**The Effect of Gas "Hora" over Susliks and the Entomo-Fauna of their Burrows.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1929. Vol. 8. No. 1. pp. 54–62. [In Russian. English summary pp. 117–118.]

ii. ——. [**The Use of Chlorpicrin for Determination of Habitation of a Suslik Burrow and for the Catching of Susliks.**]—*Ibid.* pp. 79–80. [In Russian. English summary p. 119.]

i. The authors state that as the result of some slight experience, they consider this method unsatisfactory for the determination of habitable suslik burrows. Out of 27 burrows determined as occupied 12 contained fresh nests, and only one susliks. If the burrow has been properly stopped, one capsule of the gas burning for one minute will destroy susliks in 30 minutes. The insect fauna of the burrows is not in the least affected by the gas even after 24 hours.

ii. The author proposes to use chloropicrin as a lachrymal gas when catching susliks, cotton wool moistened with 1–2 drops of chloropicrin being placed in the burrow. A trap is placed at the outlet of the burrow and a number of susliks can be quickly collected so as to determine the population of a definite area.

J. H. T. W.

i. SKORODOUMOFF. [La peste spontanée des spermophiles (*Spermophilus dauricus*) en Transbaïkalie.] [**Plague in Spermophiles in Transbaikalia.**]—*Hygiène et Épidémiol.* Moscow. 1928. No. 2. [Summarized in *Bull. Office. Internat. d' Hyg. Publique.* 1929. Feb. Vol. 21. No. 2. pp. 310–311.]

ii. ——. [Les gerboises porteurs de peste en Transbaïkalie.] [**Gerbilles as Carriers of Plague.**]—*Hygiène et Epidémiol.* Moscow. 1928. No. 5. [Summarized in *Bull. Office Internat. d' Hyg. Publique.* 1929. Feb. Vol. 21. No. 2. p. 311.]

i. In Transbaikalia there are two different species of spermophiles : *S. eversmani* and *S. Dauricus.* It was among the latter that the author found spontaneous plague. The animal is 22 cm. long and resembles

the tarabagan. It lives in burrows, easy to distinguish by their aspect and by the excrement at the entrance. The flea found on this spermophile is *Ceratophyllus tesquorum.* These spermophiles are not hunted for their fur, but their proximity to human habitations is a source of danger.

ii. Plague was found among gerbilles: *Alactaga mongolica.* These were taken in inhabited regions and this fact calls for preventive measures.

J. H. T. W.

MOLODTZOV (P.). [**Atypical Forms of the Colonies of** *B. pestis.*]—*Rev. Microbiol. et Epidémiol.* 1928. Vol. 7. No. 3. pp. 285–288. With 9 text figs. [1 ref.] [In Russian. English summary p. 339. [State Inst. of Microbiol. & Epidemiol. for S.-E. of U.S.S.R.]

These atypical forms were virulent for the guineapig. The same forms were isolated from urine, intestines and bile, while typical forms were found in other organs.

W. F. Harvey.

FUSCO (G.). Appunti pratici sulla diagnosi della peste nei murini.—*Rinnovamento Med.-Giorn. Ital. di Malat. Esotiche e Tropicali.* Naples. 1928. July 15–Aug. 15. No. 4–5. 8 pp.

GRAHAM (J. D.). Travaux de l'Institut Haffkine à Bombay sur la peste.—*Bull. Office Internat. d'Hyg. Publique.* 1928. Oct. Vol. 20. No. 10. pp. 1609–1617.

GREKOW (A. D.). [Der Pestausbruch im Narynischen Kanton der Kyrgysenrepublik im September 1928.]—*Pensée Méd. d'Usbékistane.* Tashkent. 1928. No. 3. pp. 40–46. [In Russian. German summary pp. 100–101.]

JAPAN MEDICAL WORLD. 1928. Oct. 15. Vol. 8. No. 10. pp. 266–268.—Plague Epidemic in Inner-Mongolia. Reported by the S.M.R. Sanitary Office, Dairen.

JOURNAL OF ORIENTAL MEDICINE. 1928. Nov. Vol. 9. No. 5. With 1 fig. [In Japanese. English summary pp. 67–70.] Plague Epidemic in Inner-Mongolia.

v. LINGEN (A. A.). Observations on a Series of Cases of Plague.—*Jl. Med. Assoc. South Africa.* 1928. Dec. 8. Vol. 2. No. 23. pp. 631–634.

PARREIRAS (Decio). Sobre um surto de peste, em Neves, no Municipio de Säo Gonçalo, Estado do Rio de Janeiro.—*Archivos de Hyg.* Rio de Janeiro. 1928. May. Vol. 2. No. 1. pp. 129–150. With 4 figs. & 2 maps on 4 plates. English summary facing p. 150.

RAGAZZI (C. A.). Le vie della peste in Cirenaica. Studio sommario del periodo epidemico 1913–1922 e dei pretesi focolai endemici del Barka.—*Arch. Ital. Sci. Med. Colon.* 1928. Dec. Vol. 9. No. 12. pp. 709–734. [12 refs.] [Inst. of Colonial Path., Univ., Bologna.]

ROQUES (P.). Un cas de peste pulmonaire primitive survenue à Tamatave.—*Bull. Soc. Path. Exot.* 1928. Dec. 12. Vol. 21. No. 10. pp. 876–878.

TSURUMI (Mitsuzo). Sur la petite épidémie de peste pneumonique de 1927 en Mongolie.—*Bull. Office Internat. d'Hyg. Publique.* 1928. Oct. Vol. 20 No. 10. pp. 1602–1603.

YELLOW FEVER.

LASNET. Relation de l'épidémie de fièvre jaune au Sénégal en 1927. [**The Yellow Fever Epidemic in Senegal in 1927.**]—*Bull. Office Internat. d'Hyg. Publique.* 1929. Jan. Vol. 21. No. 1. pp. 54–98. With 1 map in text. [6 refs.]

A valuable summary of observations on this epidemic dealing first with its outbreak, the clinical features, the importance of prophylactic diagnosis, with the necessity of considering all doubtful cases of fever as suspect and taking appropriate measures to prevent any chance of mosquitoes feeding on them. No satisfactory method of treatment was found although many were tried. Various methods of vaccination were used and about 500 persons received inoculations of Noguchi's vaccine; 6 of these subsequently became infected with yellow fever and 4 died. In addition various other vaccines were used including Quinby, a preparation of quinine and bismuth, but their action was very doubtful.

The epidemiology of the outbreak is considered in detail. The susceptibility of Syrians, Portuguese half-breeds, and Moroccans is well known, and attention is called to the difficulty of their supervision, for they generally live in the same way as the natives, and often conceal cases of disease until the patient is at the point of death. Although in certain localities the Syrians were the only class of the foreign population showing cases of yellow fever, suggesting that they had acquired the infection from the natives, yet careful inquiries showed that these Syrians travelled extensively by motors and had frequently visited infected neighbourhoods, often at night. The Syrians by their indifference to hygiene, their poverty and also their mobility, are considered to be of great danger in the spread of yellow fever, and it is very necessary that they should be closely supervised.

After referring to recent laboratory work on the disease the author describes the administrative measures adopted in order to control the epidemic. The difficulties of the campaign against yellow fever in West Africa and lessons to be drawn from this epidemic are discussed in the latter part of the article. In common with many other diseases, ignorance or apathy is one of the most important factors favouring the spread of epidemics, for the great majority of the cases occurred in persons who had neglected to take precautions against being bitten by mosquitoes. The report should be read in its entirety by those interested in the subject.

E. Hindle.

CAZANOVE (F.). Notes épidémiologiques sur l'épidémie de fièvre jaune du Sénégal en 1927. [**Epidemiological Notes on the Yellow Fever Epidemic in Senegal in 1927.**]—*Bull. Soc. Path. Exot.* 1929. Apr. 10. Vol. 22. No. 4. pp. 260–272.

An interesting historical account of yellow fever in Senegal during the past century, for details of which the original article should be consulted. The earlier epidemics all started at Gorée, which was formerly the chief port of the Colony, and a number of the outbreaks are attributed to the importation of cases from the Gambia. The severity of some of these epidemics is indicated by the official statistics. In 1830

at Gorée, out of 152 Europeans there were 144 yellow fever cases with 52 deaths, and at St. Louis, out of 650 Europeans, 320 deaths. In 1859, at Gorée, out of 267 Europeans, 244 cases and 162 deaths. In 1878, in Senegal generally, out of 1,474 Europeans, 749 died of yellow fever, including 22 out of 26 doctors.

It is pointed out that in Senegal the cool breezes of November diminish the activity of Stegomyia, and therefore if any yellow fever cases occur towards the end of the year the outbreak can generally be suppressed with the aid of the natural conditions without resorting to extreme measures. When, however, any cases occur in May, June or July, the rapid multiplication of mosquitoes in these and the following months, renders it necessary to use every possible means of controlling the outbreak, including the most stringent quarantine regulations.

Previous to 1878 the epidemics of yellow fever are considered to have originated from cases brought by ships mainly from the Gambia. From 1878 to 1900 the disease was probably spread by the large number of natives recruited during the economic development of the country. From 1911 to 1927, the cases seem to be spread mainly along the railways, by the movements of natives from the neighbouring regions of Saloum and the Gambia.

Finally the author advocates that the endemic regions of yellow fever should be delimited. This would necessitate the use of *Macacus rhesus* and it is suggested that a laboratory might be formed on Cap-Vert Island, where the experimental work could be performed without danger to the Colony. When the endemic zones have been discovered it would be possible to concentrate prophylactic measures, as it is obviously impracticable at present to eliminate Stegomyia from the whole of West Africa.

E. H.

LASNET. La fièvre jaune en Afrique Occidentale Française en 1928. [**Yellow Fever in French West Africa in 1928.**]—*Bull. Office Internat. d' Hyg. Publique.* 1929. Jan. Vol. 21. No. 1. pp. 49–51.

A record of 6 cases among Europeans, 3 in Dahomey of which 1 fatal, and 3 in the Ivory Coast, all fatal. Details are given of the epidemiology of two cases at Abidjan, and strong evidence is brought forward in support of the view that the second case showed the unusually long incubation period of 10 days and 10 hours, after [presumably] being infected by the bite of an infected mosquito.

E. H.

SELWYN-CLARKE (P. S.). **The Outbreak of Yellow Fever in Accra, March-June, 1927.**—*Gold Coast Rep. on Med. & San. Dept. for Year Apr., 1927 to Mar., 1928.* Appendix G. Sessional Paper XXVII. 1927–28. pp. 121–140. With 2 maps & 1 chart.

An interesting account of the outbreak of yellow fever in Accra in 1927, giving the history of previous epidemics as well as the present one. The inadequacy of present methods of recognizing the disease, especially in natives, is well exemplified in the present report, for at Asamankese, less than 50 miles from Accra, a serious epidemic of

yellow fever raged for more than two months in 1926 apparently without having been recognized, and the Rockefeller Commission estimate that during this period there were more than 1,000 cases and over a hundred deaths. Other cases were recorded from other towns in the neighbourhood, so that sources of infection for Accra were not lacking. A table is given of the number of cases of yellow fever in Europeans, Africans and Syrians, respectively, each year during the last 18 years, and it is noteworthy that even with these obviously incomplete records [*e.g.*, the above-mentioned Asamankese epidemic is not included] the disease has never been absent from the colony during the whole of this period. The 1927 epidemic in the colony affected the African population rather more than the European, for there were 88 cases with 25 deaths in the former, and 14 cases with 10 deaths in the latter. In addition there were 5 cases in Syrians with 5 deaths. Details are given of the history of 16 cases in Accra, and although the figures are too few to allow of definite conclusions being drawn, there is some evidence of the existence of mild unrecognized attacks in non-immunes, which confer some degree of protection. Only one of the fatal cases occurred in a person who had spent more than two tours in West Africa, and of the Africans only two cases occurred in the local Ga tribe comprising the majority of the population, whilst five cases were amongst immigrants from other parts.

It is suggested that the prevalence of yellow fever in coast towns in the Gold Coast for centuries has resulted in the development of some degree of local racial immunity, for the disease certainly runs a milder course among the indigenous population. With reference to the possibility of unrecognized cases in children it is a curious fact that the percentage of infant deaths to the total deaths of all ages has remained almost constant (19 to 25 per cent.) during the past seven years, in spite of infant welfare schemes and improvement in sanitary conditions and education. Finally, an account is given of the administrative provisions and preventive measures of value in combating the outbreak.

E. H.

BUCHANAN (George S.). La fièvre jaune dans l'Afrique Occidentale Britannique. [**Yellow Fever in British West Africa.**]—*Bull. Office Internat. d'Hyg. Publique.* 1929. Jan. Vol. 21. No. 1. pp. 52–53. [1 ref.]

The exact way in which NOGUCHI and YOUNG accidentally contracted yellow fever at Accra, Gold Coast, is not clear, but the author shows that the available evidence indicates the extreme likelihood of infection having been contracted in the laboratory. After Dr. Young's death it was decided to close the yellow fever laboratory at Accra, and all infected material and animals were destroyed.

Reference is made to HINDLE's work [*ante*, p. 292] and also to the fact that 1,000 cc. of his vaccine had been sent to the Belgian Congo. Mention is also made of the special laboratory accommodation required in Great Britain by the Ministry of Health, in order to avoid any risk to the general population from infected mosquitoes used in his experiments.

E. H.

PANI (M.). Sur la fièvre jaune au Mexique. [**On Yellow Fever in Mexico.**] —*Bull. Office Internat. d'Hyg. Publique.* 1929. Jan. Vol. 21. No. 1. pp. 99–100. [1 ref.]

Owing to the introduction of energetic anti-mosquito measures, especially the use of larvicides, yellow fever seems to have disappeared from Mexico, no case having been recorded since August, 1922.

E. H.

CAZANOVE (F.). La fièvre jaune des enfants. [**Yellow Fever in Children.**]—*Bull. Soc. Path. Exot.* 1929. Mar. 13. Vol. 22. No. 3. pp. 184–191.

The author gives details of the clinical symptoms of eight yellow fever cases, some fatal, in children at Dakar, ranging from 3 up to 14 years of age. These are of considerable interest, as they show all grades from very mild cases, hardly recognizable as yellow fever, up to severe fatal ones. Albuminuria was constantly present. In the discussion following the paper both Dr. Marcel LEGER and MARCHOUX consider that the natives at Dakar must have become adapted to the yellow fever virus before the epidemic of 1927. These authors are also of the opinion, as noted by MARCHOUX in Brazil, that children are distinctly less susceptible than adults to infection with yellow fever.

E. H.

KADANER (M.). Observations de quelques cas de fièvre jaune à Boma. [**Observations on Cases of Yellow Fever at Boma.**]—*Ann. Soc. Belge de Méd. Trop.* 1928. Dec. Vol. 8. No. 3. pp. 297–303.

A description of three cases of yellow fever occurring at Boma, Belgian Congo, at the end of 1927. In each case severe vomiting set in by the third day, and albuminuria on the second day.

E. H.

GOLD COAST REPORT ON THE MEDICAL AND SANITARY DEPARTMENT FOR THE YEAR APRIL, 1927 TO MARCH, 1928. Appendix C. pp. 104–109. —[**Case of Yellow Fever.**]

A detailed clinical account of a fatal case of yellow fever in a German at Accra, who had received an injection of Noguchi's vaccine four months previously. Blood collected on the third day of fever was inoculated into a rhesus monkey, which became infected and this strain, known as the "P–" strain, has been kept going in monkeys both by direct inoculation of blood and by means of mosquitoes in the Lagos Laboratory of the Rockefeller Yellow Fever Commission.

E. H.

DA CUNHA (Aristides Marques) & MUNIZ (Julio). Note sur la fièvre jaune expérimentale. [**Note on Experimental Yellow Fever.**]—*C.R. Soc. Biol.* 1929. Apr. 8. Vol. 100. No. 11. pp. 963–965.

A continuation of the authors' previous note on this subject [*ante*, p. 303]. The Brazilian virus isolated by them does not always cause the death of inoculated monkeys, and it is often difficult to decide whether the animals are infected or not. Thus one monkey bitten by infected mosquitoes showed a rise in temperature followed by hypothermy and death on the fourth day, but on autopsy only pneumonic lesions could

be found. The African virus used by the authors invariably caused death within 4 to 6 days, and the degeneration of the liver was almost always very extensive, even though very small doses were used for inoculation. The difference between the African and Brazilian virus seems to be only a question of virulence. Two monkeys infected with the African virus were killed on the 3rd and 4th days respectively and both showed distinct necrosis in the liver, with oxychromatic degeneration, more pronounced in the second individual. The early appearance of these lesions shows that the absence of these hepatic changes, as in some of the monkeys inoculated with the Brazilian virus, is not because a certain phase of the disease has not been reached, but that the appearance of the symptom depends on the virulence of the virus, which is evidently variable.

E. H.

SELLARDS (A. W.) & MATHIS (C.). Expériences de transmission du virus amaril au *Macacus rhesus*. [**Observations on Transmission of Yellow Fever to** *Macacus rhesus*.]—Reprinted from *Conférence Africaine de la Fièvre Jaune*. 12 pp. [4 refs.] 1928. Paris.

A summary of observations made at Dakar during the 1927 epidemic. Entirely negative results were obtained by the inoculation of the blood and urine of seven yellow fever patients into 19 guineapigs. Attempts were made to transmit the disease to *Macacus rhesus* by the inoculation of blood of yellow fever cases, also by the inoculation of organ emulsions or tissues obtained at autopsies, and finally by the bites of infected mosquitoes. The results indicate that in order to succeed it is necessary to get patients in the early stages of the disease, for blood collected from yellow fever cases on the 3rd to the 7th days and also all post-mortem material failed to infect monkeys.

The only successes obtained were by the inoculation of blood collected 20 hours after the beginning of fever and the bites of mosquitoes also fed at this early stage.

In the discussion Dr. LASNET stated that NOGUCHI found that infected blood preserved its virulence for several weeks, even without being kept in the ice chest. Dr. BEEUWKES found that citrated blood kept its virulence for 22 days at room temperature.

With reference to Dr. Adrian STOKES's infection, his blood was collected 12, 36 and 84 hours respectively after the beginning of the infection and inoculated into *M. rhesus*, which all died of yellow fever. Mosquitoes fed 12 hours after the onset of the disease became infected, but those fed after an interval of 36 hours remained uninfected.

E. H.

HUDSON (N. Paul), BAUER (Johannes H.) & PHILIP (Cornelius B.). **Protection Tests with Serum of Persons recovered from Yellow Fever in the Western Hemisphere and West Africa.**—*Amer. Jl. Trop. Med.* 1929. Jan. Vol. 9. No. 1. pp. 1–16. [4 refs.]

Rhesus monkeys were inoculated with yellow fever virus and doses of convalescent serum from respectively West African and South American cases of the disease. The amount of serum used varied

from 2·0 cc. to 0·1 cc., and in one experiment was inoculated at the same time as the virus, but in the two other experiments the serum was inoculated intraperitoneally one hour previous to a subcutaneous inoculation of the virus. The results show that serum from four individuals out of 11 tested, all of whom had recovered from yellow fever in South America, and seven samples of West African serum, protected monkeys against a lethal dose of a West African strain of yellow fever.

[These results confirm the now generally accepted view that the strains of yellow fever in West Africa and South America are essentially the same. *Ante,* p. 306].

E. H.

TORRES (C. Magarinos). **Intranuclear Inclusions in Experimental Yellow Fever.**—*Inst. Oswaldo Cruz, Supplemento das Memorias.* 1929. Mar. No. 6. pp. 69–71. With 5 figs. on 3 plates & 1 coloured plate. [5 refs.]

A further account of these inclusions which were found in 31 out of 43 *Macacus rhesus* infected with Brazilian and African strains of yellow fever, whilst they were not seen in 6 normal monkeys as well as nine others injected with miscellaneous material. The appearance of these bodies has been previously described [*ante,* p. 301], but in the present article the author records differences between these structures in monkeys inoculated with the Brazilian and African virus respectively.

In the African series the acidophile intranuclear material is often subdivided into minute granules; this appearance is not common in the Brazilian series, in which fragmentation of the intranuclear material is never so marked, and any granules present are less numerous and generally larger. Moreover, in the liver cells of monkeys infected with the Brazilian virus the butterfly-like intranuclear figures are very common, whilst such figures were not found in the African series. In the latter the amount of basichromatin forming thick rods on the nuclear membrane, is apparently larger than in the Brazilian series. It is suggested that in the African series there is a predominance of later stages of oxychromatic degeneration, and in the Brazilian a predominance of early stages. The differences in virulence and adaptation resulting in slight necrosis of liver cells (Brazilian) or marked necrosis (African) may account for these discrepancies.

E. H.

TORRES (C. Magarinos). Etude, par le procédé de Goodpasture et la réactions de Feulgen, des inclusions nucléaires, de la fièvre jaune expérimentale. [**A Study of Nuclear Inclusions in Experimental Yellow Fever employing Goodpasture's Method and Feulgen's Reaction.**]—*C.R. Soc. Biol.* 1929. Apr. 8. Vol. 100. No. 11. p. 966. [2 refs.]

Liver cells from monkeys infected with yellow fever were stained by Goodpasture's method, and the intranuclear bodies which coloured bluish-violet clearly differentiated from the red staining nucleoli. These intranuclear bodies seem to be the result of coagulation or precipitation of the nucleo-plasm. When tissues were stained by

Feulgen's method these bodies were found to remain uncoloured thus showing the absence of thymonucleinic acid, and proving that the intranuclear inclusions in yellow fever have a different composition from chromatin.

E. H.

LEITE (A. Lobo). Etudes hématologiques dans la fièvre jaune. [**Haematological Studies in Yellow Fever.**]—*C.R. Soc. Biol.* 1929. Apr. 8. Vol. 100. No. 11. pp. 946–948. [Oswaldo Cruz Inst., Rio de Janeiro.]

These studies in the main confirm previous observations on this subject. The leucopenia is difficult to explain, whether the result of excessive destruction, or of exhaustion of the bone marrow. Many leucocytes contain fat, which may be either the result of degeneration or have been ingested. The hyperglobuly is a result of a diminution in haemolysis which leaves in the circulation a large number of old red cells. The jaundice is extra-hepatic and finally the haemorrhagic syndrome may be interpreted as an attempt on the part of the body to defend itself against the changes, in particular the accumulation of old red cells which have lost their power of transporting oxygen.

E. H.

PICHAT (Jean). Note sur l'urine de sujets atteints de fièvre jaune. [**The Urine in Yellow Fever Patients.**]—*Bull. Acad. Méd.* 1929. Mar. 27. Year 93. 3rd Ser. Vol. 101. No. 12. pp. 445–447. [8 refs.]

The results of the examination of 2,000 specimens of urine during the yellow fever epidemic in Dakar, 1927, and also in Dahomey, 1924, indicate that urine analysis furnishes a useful aid to the diagnosis of this disease. During the epidemic at Dakar the urine of yellow fever cases was examined twice daily, and the results are as follows :—

During the first two days the urine is clear and abundant, but loses its chlorine very rapidly. The quantities of urea and urobilin are normal and there is no trace of bile or blood pigments. In typical cases albumin appears towards the end of the second day and rapidly increases in amount from 1 to 10 gm., or even more, each day. From the fourth day, generally correlated with the appearance of black vomit, peptones appear in the urine and increase up to death. This increase in the amount of peptones is an almost certain sign of a fatal termination and is of value in prognosis. The urine does not contain sugar, blood, haemoglobin, no excess of urobilin, and only rarely traces of bile pigments. It is readily distinguished from the urine in other diseases. The appearance of bile pigments in quantity on the fifth day is an almost certain indication of recovery. They persist for about ten or twenty days ; the peptones disappear almost at once. The albumin persists for three or four days, then falls and disappears, unless a relapse occurs. The chlorides increase very slowly and the normal composition of the urine does not become re-established until about a month after the attack. In some atypical cases the amount of albumin rose to 8 to 10 gm. per litre in patients showing neither cardiac nor renal trouble, nor any digestive symptoms, and in these

cases bile pigments appeared during the convalescence. Three cases with meningitic symptoms showed no change in the quantity of albumin, and the bile pigments and chlorides never appeared in the urine, or only in minute quantities.

E. H.

LEGENDRE (J.). La fièvre jaune peut-elle s'étendre à tous les pays à Stégomya ? [**Can Yellow Fever spread into all Stegomyia Countries ?**]—*Presse Méd.* 1929. Apr. 6. Vol. 37. No. 28. pp. 459–460. With 1 map in text. [1 ref.]

An article maintaining the author's previous view that there are two races of *Aedes aegypti*, a large one capable of transmitting yellow fever, and a small Oceanic and Indian species incapable of transmitting the disease.

[These two so-called races have been shown to be identical by cross-breeding experiments (see HOFFMANN ; BRUG, this *Bulletin*, Vol. 25, p. 549). Moreover, HINDLE (*ante*, p. 292) has shown that yellow fever may easily be transmitted from monkey to monkey by the bites of an Indian strain of *Aedes aegypti*.]

E. H.

BARRETO (João de Barros) & PERYASSÚ (Antonio Goncalves). Da aspersão de insecticidas na prophylaxia da febre amarella. [**Sprinkling of Insecticides in Prevention of Yellow Fever.**]—*Brasil-Medico.* 1929. Mar. 30. Vol. 43. No. 13. pp. 350–359.

Many experiments were carried out to determine the best method of destroying adult Aëdes in buildings. A table is given showing the preparation used and the quantity per cubic metre, the size of the rooms and whether all crevices were sealed or not, the number of mosquitoes introduced and the results. Sixty-two experiments were performed and the chief substances used were " Flit," a Standard Oil preparation ; " Stegol," a mixture of pyrethrum, xylol, cresol and methyl salicylate in paraffin ; carbon tetrachloride 7 per cent. with methyl salicylate 3 per cent. [Where conditions are so varied little valid inference can be drawn from the results. Thus 10 cc. of Stegol was insufficient to kill the mosquitoes in one room of 170 c. metres, but 12 cc. proved quite effectual in another room of 548c. metres].

H. Harold Scott.

ARAGÃO (Henrique de Beaurepaire). **Yellow Fever Virus. Transmission of Brazilian Strains to** *Macacus rhesus* **and** *Macacus cynomolgus* : **Preliminary Report.**—*Jl. Amer. Med. Assoc.* 1929. Feb. 16. Vol. 92. No. 7. pp. 550–551. With 2 charts in text. [2 refs.] [Oswaldo Cruz Inst., Rio de Janeiro.]

See this *Bulletin*, Vol. 26, pp. 303-306.

E. H.

TORRES (C. Magarinos). Inclusões nucleares na febre amarella.—*Brasil-Medico.* 1929. Apr. 6. Vol. 43. No. 14. p. 380. [Oswaldo Cruz Inst., Rio de Janeiro.]

RELAPSING FEVER AND OTHER SPIROCHAETOSES.

PICKOUL (I. N.). [Fièvre récurrente à tiques d'Asie Centrale et son agent pathogène.] [**Tick Fever in Central Asia and its Pathogenic Agent.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 10. pp. 612–618. With 2 figs. on 1 plate. [10 refs.] [In Russian. French summary p. 618.] [Trop. Inst., Moscow & Trop. Inst., Usbekistan.]

An epidemic of relapsing fever transmitted by the local species of Ornithodorus has been observed by the author at Fergan in Bukhara. The author has transmitted the infection to human patients, rats, mice and guineapigs, by the bites of this tick, and also by percutaneous or subcutaneous inoculation of infected blood. The spirochaetes are rare in the blood of man, and also in rats and mice, but in guineapigs the organisms are very numerous and cause a mortality of about 40 per cent. The spirochaete is morphologically identical with *S. recurrentis* and *S. duttoni*, but the results of cross-immunity experiments indicate its distinctness from these races and therefore the author proposes a new name, *Spirochaeta usbekistanica*, for the pathogenic agent of human tick fever of Central Asia.

E. Hindle.

DOUBROWINE (V. Ph.). [Sur la question de typhus recurrens dans le département de Samarquand.] [**Relapsing Fever in the Province of Samarkand.**]—*Pensée Méd. d' Usbékistane.* Tashkent. 1928. Nov. No. 2. pp. 23–31. With 6 charts in text. [6 refs.] [In Russian. French summary p. 97.]

In this province relapsing fever is endemic and 36 cases were observed in the military hospital in 1924, 1925 and 1926. The disease although mild was occasionally complicated by iridocyclitis. Neosalvarsan was found to have no effect on the febrile attacks, but might prolong the apyrexial intervals.

E. H.

LOZANO (Pedro) & PEÑA (Marcelino). Los primeros casos de fiebre recurrente en Avila. [**Relapsing Fever in Avila, Spain.**]—*Medicina Países Cálidos.* Madrid. 1928. Nov. Vol. 1. No. 6. pp. 543–545.

Cases of the Spanish type of relapsing fever have been met with in Toledo, Cáceres, Badajoz, Córdoba, Huelva, and Sevilla. Two cases are now recorded in Avila, both quite mild, which, but for enlargement of lymphatic glands to the size of a chickpea to a hazelnut, painless and non-adherent, and the absence of rigors, would probably have been regarded as malarial.

H. Harold Scott.

i. HORNUS (Pierre). Note au sujet de la fièvre récurrente marocaine. [**Moroccan Relapsing Fever.**]—*Arch. Inst. Pasteur de Tunis.* 1928. Dec. Vol. 17. No. 4. pp. 327–331. With 1 chart in text.

ii. NICOLLE (Charles) & ANDERSON (Charles). Réflexions à propos du mémoire de P. Hornus sur la fièvre récurrente marocaine.—*Ibid.* 332–334. [1 ref.]

i. It may be recalled that DE BUEN [see this *Bulletin*, Vol. 23, p. 590] thought that Moroccan relapsing fever was associated with the presence of pigs. The author (P. Hornus) has observed various cases of the disease in which this possibility was excluded. The Moroccan relapsing fever seems to attack Europeans in preference to Africans, and especially during the spring and autumn. The parasite transmitting the infection has not been discovered, but it seems to be present in the soil or in the walls of houses and to retain its infectivity for considerable periods.

This type of relapsing fever can be inoculated into guineapigs in which it produces a series of relapses resembling those in man, and lasting from 18 to 25 days. The strain can be maintained in guineapigs.

ii. Nicolle and Anderson make some observations and suggestions based on the preceding article and are in complete agreement with the view that the presence of the disease is not correlated with keeping pigs. They incline to the view that rodents will be found to be the natural host of the spirochaete.

E. H.

ARCHIVES DE L'INSTITUT PASTEUR DE TUNIS. 1929. Mar. Vol. 18. No. 1. pp. 84–85. [3 refs.] A propos de l'article : Fièvre à tiques marocaine du médecin capitaine CHAUBET. [**Concerning Chaubet's Article, Moroccan Tick Fever.**]

A note calling attention to three cases of relapsing fever recorded by Captain Chaubet from Morocco, in which the patients became infected after having been bitten by ticks at Bou-Knadel.

E. H.

LIMBOR. Notes sur trois cas de fièvre récurrente observés à Usumbura (Urundi). [**Notes on Three Cases of Relapsing Fever observed at Usumbura (Urundi).**]—*Ann. Soc. Belge de Méd. Trop.* 1929. Mar. 31. Vol. 9. No. 1. pp. 45–57. With 3 charts in text.

The author has observed and treated numerous cases of this disease in both natives and Europeans, in the latter of whom it is much more severe, and details are given of three patients illustrating the different course of the disease in Europeans. In addition the author gives a summary of his experience of treatment. The action of Novar or "914," during the first attack is very variable; in at least a third of the cases it does not influence its duration; more often, it shortens its duration and occasionally suppresses the attack. Large doses (0·6 to 0·75 gm.) have no better effect than smaller ones of 0·3 to 0·45 gm. Subcutaneous or intramuscular injections of acetylarsan (3 cc.) had the same effect as intravenous novar. Stovarsol by mouth (1·50 gm.)

seemed to be as efficacious as injections of the other compounds, but the author's experience is limited. The inoculation of a second but smaller dose of novar (0·15 gm.), or acetylarsan (2 cc.) the day after the first injection seems to hasten the termination of the attack. The systematic use of repeated injections was found to be useless and is condemned by the author. Most cases were cured by one large and one small dose and no further treatment was required except in the case of relapses.

E. H.

ADCOCK (E. W.). **Meningismus in Relapsing Fever.** [Correspondence.]—*West African Med. Jl.* Lagos. 1929. Jan. Vol. 2. No. 3. p. 172.

A record of a case of relapsing fever at Kano [Nigeria] in which the patient showed symptoms of meningitis. A cerebro-spinal puncture resulted in spirochaetes being found, instead of diplococci, and the condition cleared up by crisis after an intravenous injection of 0·6 gm. novarsenobillon.

E. H.

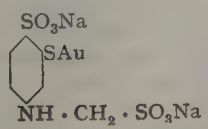
DE BUEN (Sadi). Nota preliminar sobre el tratamiento de la fiebre recurrente española. [**The Treatment of Spanish Relapsing Fever.**]—*Medicina Países Cálidos.* Madrid. 1928. Nov. Vol. 1. No. 6. pp. 539–542. [1 ref.]

Eight patients infected with Spanish relapsing fever were treated with 0·3 gm. salvarsan or allied compounds, intravenously and only two relapsed. Three were given stovarsol, 1 gm. daily by mouth, and two relapsed. Five had 1 gm. daily of spirocid [the formula of which is identical with that of stovarsol] and two relapsed.

E. H.

STEINER (G.) & FISCHL (Viktor). Experimentelle Untersuchungen zur Pathologie und Therapie der Spirochätenkrankheiten. Ueber die Wirkung von Goldpräparaten bei experimenteller Recurrens. [**An Experimental Study of the Pathology and Treatment of Spirochaetosis. The Action of Gold Compounds on Experimental Relapsing Fever.**]—*Klin. Woch.* 1929. Mar. 26. Vol. 8. No. 13. pp. 582–585. [17 refs.] [Psychiat.-Neurolog. Clinic, Univ., Heidelberg.]

The authors have tested the action of two gold compounds, Solganal and A 69 on rats and mice infected with a strain of *S. duttoni*. Solganal has the following composition :—



and contains 36·5 per cent. of gold. A 69 is a similar preparation adapted for intramuscular injection. Both compounds were found to have a

much higher chemotherapeutic index than neosalvarsan, as indicated by the results of comparative tests. In addition residual infections of

Strain.	Compound.	Injection.	Dose per 20 gm. mouse in gms.		Relapse after	Therapeutic Index.
			Dosis tolerata.	Dosis curativa.		
S. recurrentis.	Neosalvarsan	Intravenous ...	1/135	1/400	6 days	1 : 3
,,	Solganal ...	,, ...	1/100	1/1000	?	1 : 10
S. duttoni	Solganol ...	Intraperitoneal	1/100	1/2000	6 days	1 : 20
,,	A 69 ...	Intramuscular	1/70	1/1250	6 days	1 : 18

the central nervous system were entirely eliminated by these two gold preparations, whilst salvarsan and its derivatives have no action on such residual infections. Particulars are given of the successful treatment of experimental relapsing fever in a paretic patient by means of repeated intravenous injections of solganal, in which after the second injection the blood became negative, as tested by subinoculations into mice, and the cerebro-spinal fluid was negative when tested after 19 days.

When administered as a prophylactic it was found to check the development of infection. Four mice were each given two injections of solganal with an interval of 5 days, and 1 day later inoculated with spirochaetes. Control animals inoculated at the same time died of the infection within 4 days, whilst the others were negative until the seventh day, when two showed spirochaetes and the other two succumbed to an intercurrent disease.

E. H.

SAGEL (Wilhelm). Eigene Beobachtungen ueber den ungestörten und den durch chemotherapeutische Massnahmen beeinflussten Infektionsverlauf, ueber das Verhalten der Immunität, das leukozytäre Blutbild und klinische Erfolge bei mit verschiedenen Recurrensstämmen künstlich infizierten Paralytikern. [**Observations on Immunity, the Leucocyte Formula, and Clinical Effects of Various Strains of Relapsing Fever used in Cases of Paralysis.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Vol. 32. No. 6. pp. 283–322. [44 pp.] With 34 charts in text. [1 ref.]

A detailed study of treated and untreated attacks of relapsing fever based on observations of cases of paralysis experimentally infected with this disease. Five strains of relapsing fever were used, *S. duttoni*, Moroccan, Spanish and Angola strains, all of which had been maintained in white mice, and another strain of *S. duttoni* in ticks. Advantage has been taken of the opportunity of making detailed studies of experimental infections with these strains and in addition the results indicate that relapsing fever is a very efficient substitute for malaria in the treatment of cases of paralysis.

The Moroccan (*S. berbera*), Spanish (*S. hispanica*) and Angola strains of relapsing fever have not previously been used therapeutically, but all three were found to be as efficacious as *S. duttoni*. It is necessary

however to use strains kept in white mice, for the bites of *Ornithodorus marocanus* infected with *S. berbera*, produced such very severe attacks that their therapeutic use is out of the question.

Neosalvarsan and sodium benzazon were found to check infections with the three strains mentioned above, but had very little effect on *S. duttoni*. When an attack of relapsing fever is checked by chemotherapeutic agents, the development of antibodies against the infection is arrested at the stage already reached by the body of the host; consequently varying stages of immunity will be shown by treated persons, depending on the period of the disease when treatment was begun. In order to succeed in the treatment of relapsing fever, the author found it necessary to administer the drug at a certain stage of the disease, when a number of febrile attacks had resulted in the development of a degree of natural immunity; also the temperature should be rising and spirochaetes present in the blood. Under these conditions arsenical preparations will produce an immediate effect.

If these conditions are not fulfilled the remedy may have a harmful effect resulting in the spirochaetes being driven from the blood into other parts of the body often with the development of typhoid symptoms. These observations may help to explain the course of the disease in the later stages of syphilis, involving affections of the blood vessels and nervous system.

Each of the four strains used, when allowed to run its full course untreated, resulted in the development of a specific immunity only against itself, and not a general immunity against other strains of relapsing fever. However, this immunity seems to be only a relative one, since it is not entirely bound up with the strain used, but also depends on the way in which the strain has been maintained. For example, patients infected by the bites of ticks infected with *S. berbera* were not immunized against the subsequent inoculation of the blood of mice infected with this spirochaete. It would seem that far reaching biological changes are induced by changes in the environment of these spirochaetes, which may help to explain many of the discordant results of experiments on immunity (especially its duration) and allied problems. When it is seen that similar strains may become different after changes in passage, it is not unreasonable to assume that when different strains are maintained under identical conditions for long periods, they may come to resemble each other as in the case of *S. duttoni* and *S. hispanica*.

It appears that with experimental relapsing fever in paralytics, a true immunity is developed and not an infectious one. The relations of the course of the infection and the stage of immunity to the blood forming organs, and the blood picture influenced by these changes, are reflected in the different leucocyte curves. Consequently, when the disease is untreated, an "immunizing curve" is shown; by reinoculation with an homologous strain, when immunity already exists, an "immunity curve" is obtained; by successful treatment a "sterilizing curve"; with unsuccessful treatment a "displacement curve" and by the inoculation of inactive substances a "neutral curve."

One hundred and two cases of paralysis have been treated with the aid of relapsing fever during the past three years; 42 completely recovered, 13 partly recovered and 8 showed some improvement; it is evident, therefore, that relapsing fever, especially strains susceptible to chemotherapeutic agents, is a useful adjunct in the treatment of paralysis.

E. H.

TALICE (R.). Piretoterapia con *Treponema hispanicum.* [**Pyreto-Therapy by Means of** *Treponema hispanicum.*]—*Medicina Países Cálidos.* Madrid. 1928. Nov. Vol. 1. No. 6. pp. 531–538. With 3 figs. & 4 graphs in text.

By the term Pyreto-therapy is meant the treatment of disease by a second infection with the purpose of inducing fever, for instance, the treatment of general paralysis by malaria.

Sadi DE BUEN in 1922 discovered a new form of relapsing fever due to *S. hispanica*, which is of a mild type and usually clears up spontaneously. The suggestion is made, therefore, to use this for the treatment of nervous affections. The natural vector is *Ornithodorus marocanus.* This method of treatment has been tried in 40 cases in Monte Video—20 cases of general paralysis, 9 of secondary syphilis, 7 of dementia praecox, and 4 epileptics. It is too early to judge of the effects in the first group, but the convulsions in the epileptics ceased during the febrile periods. Clinically, the others have not shown much, if any improvement, but the spinal fluid of the paralytics contains less albumin and a smaller lymphocyte count. The results are not so good as those from malarial treatment; the advantages are that the virus is easy to conserve and handle and that the disease produced is mild, well borne, cures itself spontaneously and leaves no sequelae.

H. Harold Scott.

ARISTOWSKY (W. M.) & WAINSTEIN (A. B.). Rekurrens-Schutzimpfungsversuche am Menschen. [**Experiments on Protective Inoculation against Relapsing Fever in Man.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1929. Apr. 12. Vol. 61. No. 3/4. pp. 296–308.

Working with a strain of European relapsing fever (*S. recurrentis*) the authors found that the inoculation into men of spirochaetes of the original attack, killed by heating to 60° C. for half an hour, was followed by the development of specific spirochaetolysins in the blood. Also such a patient was protected against a subsequent subcutaneous inoculation of a living culture of the same type of spirochaetes (*i.e.*, of the original attack). This vaccination against the spirochaetes of the first attack ("Ausgangsrasse") gave no protection against the inoculation of spirochaetes of the relapses of the same race. The inoculation of a relapse strain resulted in the development of spirochaetolysins which did not protect against infection with the original strain, although the patient was immune against subsequent infection with the relapse strain. The inoculation of spirochaetes of the relapse strain killed by heating to 60° C. for half an hour, did not result in the formation of any spirochaetolysins in the blood, either against the relapse strain or the original one.

E. H.

WAINSTEIN (A.). Immunologische Beobachtungen beim Rekurrens des Menschen. I. Mitteilung. [**Immunological Observations on Human Relapsing Fever.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1929. Vol. 60. No. 3/4. pp. 142–155. With 1 chart in text. [18 refs.] [Microb. Inst., Tatar Health Commissariat, Kasan.]

The treatment of human cases of paralysis by infection with relapsing fever has enabled the author to make various observations on lysins

and the biological relationships of a race of *S. recurrentis* that had been grown on Aristowsky-Hoelzer's medium. The inoculation of a culture of this race was followed by the development of lysins against the spirochaetes of the original attack, and their titre rose suddenly after the first febrile attack, then showed a slight fall before the first relapse, followed by a second rise that started before the relapse and continued for a few days afterwards; finally, there was a second fall to a level at which the titre remains more or less constant. The first relapse was succeeded a few days later by the development of lysins against first-relapse spirochaetes, but their titre only rose to a level less than one hundredth that of the lysins against the original attack. Probably as a result of this low titre of lysins against the relapse spirochaetes, patients who have been infected by the inoculation of organisms cultured from an original attack may be reinfected by the inoculation of spirochaetes cultured from either the first or second relapse. The author maintained these three modifications of a race of *S. recurrentis* in culture, and found that their immunological properties remained distinct.

E. H.

NICOLLE (Charles), ANDERSON (Charles) & RAHAL (Magid). Contamination simultanée de laboratoire par deux virus récurrents. [**A Laboratory Infection with Two Strains of Relapsing Fever simultaneously.**]—*Arch. Inst. Pasteur de Tunis.* 1929. Mar. Vol. 18. No. 1. pp. 55–62. With 1 chart in text.

One of the laboratory workers suffered from an attack of relapsing fever unquestionably acquired in the laboratory. The inoculation of his blood into guineapigs, rats and mice resulted in them all becoming infected with spirochaetosis, and the pathogenicity of the spirochaete for guineapigs showed that it must be either *S. hispanica*, its var. *marocana*, or *S. sogdiana*. Cross immunity experiments showed that both *S. marocana* and *S. sogdiana* were present in the virus isolated from the patient. [This is the first record of the latter species occurring in man.]

E. H.

NICOLLE (Charles), ANDERSON (Charles) & HORNUS (Pierre). Sur un nouveau spirochète d'un cas de fièvre récurrente du Maroc. [**A New Spirochaete from a Case of Relapsing Fever in Morocco.**]—*C.R. Acad. Sci.* 1929. May 6. Vol. 188. No. 19. pp. 1211–1213.

This spirochaete was isolated from a case of relapsing fever in a European at Bou Znika. Although the infection in its long duration (eight attacks), resistance to arsenicals, etc., resembled ordinary tick fever, the results of animal inoculation experiments were peculiar. Thus the spirochaete is pathogenic to guineapigs as well as to the common small rodents and monkeys. The immunity following an attack is complete against the same strain for at least a month, whilst against *S. hispanica*, the Spanish relapsing fever strain, the immunity is complete for 15 days and still present to a lesser degree after a month. There was no immunity, however, against the Moroccan variety of *S. hispanica*, although this strain was obtained from ticks at

Mansouria, Morocco, only a short distance from Bou Znika. Experiments with the serum of this new spirochaete gave complete agglutination with the homologous organism, but only partial with *S. hispanica*, and negative results with *S. hispanica* var. *marocana*. The organism seems to be transmitted by *Ornithodorus marocanus* and attempts with lice gave negative results ; in this respect the spirochaete resembles the Moroccan strain, but differs from the Spanish one. Three races of spirochaetes transmitted by Ornithodorus have now been isolated in Morocco, all of which show minor differences, and this last one shows closer affinities with the Spanish race, so far as serological reactions are concerned. It is evident, therefore, that these reactions can have little significance for the distinction of spirochaetes, for there can be little doubt that the three races in Morocco, all transmitted by *O. marocanus* and all pathogenic to guineapigs, must belong to the same group.

The authors very aptly call attention to the bearing of these observations on the naming of spirochaetes, for if each race, identified only on its serological properties, was given a distinct name, the result would be a large number of specific names of little or no significance. The authors propose to call these Moroccan races *S. hispanica* var. *marocana*, from Mansouria, or from Bou Znika, etc., thus merely adding the name of the locality from which the race is obtained, without any specific designation.

E. H.

NICOLLE (Charles), ANDERSON (Charles) & COLAS-BELCOUR (Jacques). Adaptation expérimentale de spirochètes récurrents à des ornithodores autres que ceux qui les transmettent dans la nature. [**The Experimental Adaptation of Relapsing Fever Spirochaetes to Ornithodorus other than those which transmit them in Nature.**]—*C.R. Acad. Sci.* 1928. Dec. 10. Vol. 187. No. 24. pp. 1105–1107. Also in *Arch. Inst. Pasteur de Tunis.* 1929. Mar. Vol. 18. No. 1. pp. 53–54.

A brief statement of the authors' views on this subject, based to a large extent on their experiments. As a rule, in nature, any particular relapsing fever transmitted by Ornithodorus is found to be associated with some particular species. There are partial exceptions to this rule, such as *O. marocanus*, which transmits *S. hispanica* in Spain and in Morocco *S. marocana*. The same spirochaete, *S. normandi* at Carthage, is transmitted by two species of ticks, *O. erraticus* and *O. normandi*. Experimentally, it seems to be the rule that any species of Ornithodorus can serve as a host for any strain of relapsing fever spirochaete. *O. moubata* in addition to tick fever (*S. duttoni*) has been shown capable of transmitting *S. hispanica*, *S. marocana*, *S. sogdiana*, and *S. normandi* ; *O. savignyi* can also transmit all these spirochaetes ; *O. marocanus*, all except perhaps *S. normandi* ; *O. normandi* transmits in addition to *S. normandi*, *S. duttoni* and *S. sogdiana*.

In order to effect transmission it is necessary to employ the nymphal stage, for the adults although becoming infected rarely become capable of transmitting the infection by their bite ; secondly, the blood of the vertebrate host should contain numerous spirochaetes. Whenever an experiment has been continued long enough, hereditary transmission was observed in the ticks. This transmission seems to be capable of

passing through several generations when the Ornithodorus is the natural carrier, but disappears sooner when the tick is a strange host. For example, *S. hispanica* in *O. moubata* will only pass through three generations. Any attempts to pass from Ornithodorus to another genus of ticks or other invertebrate carriers meets with great difficulties and they only partially succeed, e.g., *S. gallinarum* in *O. marocanus*, *S. hispanica* and *S. duttoni* in the louse.

It is evident that the relation between any particular spirochaete and the Ornithodorus by which it is transmitted is merely a geographical one. Consequently, the habits of these ticks is the only check on the spread of the spirochaetes they transmit.

E. H.

TALICE (Rodolfo V.). Sur le rôle du *Pediculus vestimenti* dans la transmission de la fièvre récurrente espagnole (expérimentation sur l'homme et les animaux). [**The Rôle of** *P. vestimenti* **in the Transmission of Spanish Relapsing Fever.**]—*Ann. Parasit. Humaine et Comparée.* 1929. May 1. Vol. 7. No. 3. pp. 177–189. [9 refs.]

Attempts to transmit Spanish relapsing fever by means of *Pediculus humanus* in 13 men, 13 mice, 7 rats and 1 monkey were negative, with the exception of one of the human cases. This patient showed spirochaetes in his blood 18 days after being inoculated with an emulsion of infected lice, but sub-inoculations into laboratory animals were negative, and also Ornithodorus fed on this patient did not become infected. It is evident, therefore, that the louse is not a favourable host for the Spanish strain of relapsing fever.

E. H.

NICOLLE (Charles) & ANDERSON (Charles). Sur la nécessité de l'identification et d'un controle des spirochètes récurrents entretenus dans les laboratoires. [**The Necessity of Identification and Control of Relapsing Fever Spirochaetes kept in Laboratories.**]—*Arch. Inst. Pasteur de Tunis.* 1929. Mar. Vol. 18. No. 1. pp. 73–83. With 1 fig. [3 refs.]

The authors in a previous communication [see this *Bulletin*, Vol. 25, p. 596] called attention to the danger of different strains of spirochaetes becoming mixed in the course of laboratory experiments. The present article contains two striking examples of such confusion, strains obtained from laboratories as the European relapsing fever strain, *S. recurrentis*, being found to be in one instance *S. duttoni* and in the other an unknown virus differing from both *recurrentis* and *duttoni*.

The practical consequences are then discussed and the authors strongly advise all laboratories to get rid of any strains of spirochaetes when there is the slightest doubt as to their origin. In conclusion a list is given of the strains kept at the Pasteur Institute of Tunis. These are generously placed at the disposition of any laboratories requiring them.

List of Relapsing Fever Spirochaetes kept at the Pasteur Institute, Tunis.

A. *Strains isolated by the Pasteur Institute, Tunis.*

(1) *S. hispanica* var. *marocana*, isolated from *Ornithodorus marocanus*, in Province of Bou-Znika, Morocco, December, 1926,

(2) *S. normandi*, isolated from *O. normandi*, in Province of Kef, Tunis, May, 1927.

(3) *S. gondii*, isolated from *Ctenodactylus gondi*, in Province of Matmata, Tunis, May, 1928.

B. *Strains from other laboratories, tested at the Institute.*

(4) *S. hispanica*, isolated by S. de Buen from *Ornithodorus marocanus* in Spain, and obtained from Prof. Brumpt.

(5) *S. duttoni*, isolated by Ouzilleau and obtained from Prof. Mesnil.

C. *Strains tested at the Institute which will not be maintained indefinitely.*

(6) *S. crocidurae*, isolated by C. Mathis from the blood of a shrew mouse at Dakar. This spirochaete is identical with *S. duttoni*.

(7) *S. sogdiana*, isolated from *Ornithodorus papillipes* from Province of Bokhara, Russian Turkestan, March, 1928.

(8) A spirochaete pathogenic to guineapigs, isolated by P. Hornus from human cases of relapsing fever in Morocco.

(9) An undetermined spirochaete known as the Amsterdam virus, obtained from Prof. Bruynoghe who had previously received it from Prof. Schüffner as a strain of *S. recurrentis*.

D. *Strains which have been studied and then abandoned.*

(10) *S. normandi* var. *carthaginensis*, isolated from *Meriones shawi*, in Province of Carthage, June, 1927.

(11) *S. normandi*, an undetermined variety, isolated from *Ornithodorus erraticus* from Carthage, May, 1928.

(12) *S. duttoni*, a strain from Kling Laboratory, Stockholm.

E. H.

ARISTOWSKY (W. M.) & HOELTZER (R. R.). Ueber die morphologische Veränderlichkeit der *Spirochaeta Obermeieri*. [**The Morphological Variability of** *Spirochaeta recurrentis*.]—*Zent. f. Bakt.* I. Abt. Orig. 1929. May 10. Vol. 112. No. 1/2. pp. 44–49. With 2 text figs.

Cultures of *S. recurrentis*, after having been maintained in the laboratory for a considerable period, were found to contain two distinct types of spirochaetes. One type, resembling the typical form occurring in the blood, was composed of individuals with uniform, moderate-sized spirals, and was the only type found in earlier cultures. In later cultures a second type appeared with irregular spirals, suggesting the disappearance of the axial filament around which the regular spiral of the first type is arranged. These second type organisms are very distinctive in their irregular appearance and in two-year-old cultures were found to have almost replaced the original form. It is of great interest that the inoculation of these second type spirochaetes into patients resulted in the development of typical relapsing fever and the spirochaetes in the blood were of the second type, resembling those that had been inoculated. Consequently their appearance cannot be explained as a direct response of the organism to the physiological conditions of the culture media, as suggested by ZUELZER. The fact that spirochaetes can present morphological variations of this nature without any corresponding change in pathogenic properties is further evidence in support of the view that it is impossible to distinguish these organisms by means of their form.

E. H.

MELENEY (Henry Edmund). **Suppression of the First Attack with Subsequent Relapse: an Immune Phenomenon in Experimental Relapsing Fever.**—*Jl. Experim. Med.* 1928. Dec. 1. Vol. 48. No. 6. pp. 805–809. [3 refs.] [Peking Union Med. College, Peking, China & Dept. of Preventive Medicine & Public Health, Vanderbilt Univ., Nashville, Tennessee.]

A continuation of the author's observations on splenectomized squirrels infected with *Spirochaeta recurrentis*, in which six strains were isolated as the result of relapses. Whereas the strains appearing in alternate attacks were related to each other, those in consecutive attacks were immunologically distinct [*ante*, p. 117]. In five cases delayed attacks occurred when animals were reinoculated with a strain of spirochaetes which had recently been present in the blood, and this delay seems to be due to suppression of the first attack. This was proved by the fact that the spirochaetes of the delayed attack belonged to a different strain from the one inoculated, showing they were relapse spirochaetes. In these immunized animals, when spirochaetes are injected most of them are destroyed, but a few are able to adjust themselves to the environment. In other words, this is the same position as at the end of the first attack, when the spirochaetes in the blood are destroyed by the development of immune bodies. In both types of animals a few spirochaetes survive and undergo a biological change into a new strain. About 6 days is enough for the spirochaetes of the new strain to multiply sufficiently to be evident in the blood. This is the negative period and is followed by the relapse due to the new strain of spirochaetes. This phenomenon emphasizes that in relapsing fever any immunity is restricted to the strain or strains pro ducing it, or to closely related strains. E. H

JAKIMOW (W. Ph.). Versuche passiver Immunisierung bei experimenteller Rekurrens. [**A Study of Passive Immunization in Experimental Relapsing Fever.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1929. Vol. 59. No. 3/4. pp. 288–297. [14 refs.] Also in *Rev. Microbiol., Epidémiol. et Parasit.* 1929. Vol. 8. No. 1. pp. 3–10. [14 refs.] [In Russian. German summary p. 111.]

It is well known that spirochaetal infections may persist in the body and produce a type of immunity known as "*immunitas non sterilisans.*" The author has investigated the immunity problem in mice and rats infected with relapsing fever spirochaetes and finds that by the inoculation of immune sera a passive immunity can be produced which is obviously not the result of any persistent organisms. The intensity and stability of this passive immunity depends on the intensity and concentration of the immune serum. There seem to be two types of protection against spirochaetal diseases therefore, first the persistence of a residual infection protecting the host against subsequent attacks, and, secondly, the development of immune bodies. When a passively immunized animal is inoculated the incubation period is prolonged up to 14 days, the type of spirochaete modified and the number of attacks diminished.

[The prolongation of the incubation period is probably the result of suppression of the first attack, which would explain the modification of the strain. *Cf.* MELENEY, above. E. H.

LEVADITI (C.) & ANDERSON (T. E.). L'état du virus de la fièvre récurrente (*Spirochaeta duttoni*) dans l'encéphale de la souris. [**The Condition of Relapsing Fever Virus** (*S. duttoni*) **in the Brain of the Mouse.**]—*C.R. Soc. Biol.* 1929. Apr. 26. Vol. 100. No. 13. pp. 1121–1123. [3 refs.]

The authors have previously recorded that they were unable to find spirochaetes as such in the brains of mice that were proved by subsequent inoculation experiments to contain the virus of relapsing fever [see this *Bulletin*, Vol. 25, p. 593]. Further experiments demonstrate that when a piece of such an infected brain is introduced into a susceptible animal, the latter shows spirochaetes in its blood after an incubation period of 4 to 7 days. During this period, although spirochaetes cannot be detected, the peritoneal exudate and blood are infectious within a few hours of the inoculation. The authors consider that spirochaetes have an invisible stage, and that this stage is neurotropic and persists in the brain of animals showing these residual brain infections. Filtration experiments showed that this stage is very easily adsorbed in filters with pores even up to 15μ to 21μ in diameter. The virus was only able to pass through filters with pores 25μ to 36μ in diameter. The readiness with which the virus is adsorbed in filters suggests that it may readily become attached to the cells of the body.

E. H.

HARTOCH (O.) & ROTHERMUNDT (M.). Experimentelle Studien mit Syphilis und Rekurrensspirochätose. VII. Untersuchungen ueber die Sterilisierung mit Salvarsan bei experimenteller Rekurrensinfektion der Mäuse. [**Experimental Studies on Syphilis and Relapsing Fever Spirochaetes. VII. Sterilization of Mice infected with Relapsing Fever by Salvarsan.**]—*Deut. Med. Woch.* 1928. Dec. 21. Vol. 54. No. 51. pp. 2136–2138. [16 refs.] ["Georg-Speyer" House, Frankfurt a. M.]

Mice infected with relapsing fever in the early stages of the disease were found to be sterilized by the injection of a single dose of salvarsan, or neosalvarsan, considerably below the *dosis tolerata* of the drug.

With regard to the question whether such mice are completely sterilized, the inoculation of blood and brains of these animals showed that a dose of 1/300 gm. neosalvarsan per 20 gm. bodyweight was sufficient to effect a cure. It is curious that 3 out of 34 mice injected with a slightly higher dose, 1/250 gm., were not completely sterilized. The authors recall that in relapsing fever epidemics odd cases occur which do not seem to respond to treatment with salvarsan and discuss possible explanations.

When testing the value of any therapeutic agent it is necessary to employ strains that do not deviate from the normal type as regards their immunological properties. It is considered probable that the two relapsing fever strains which often produce chronic infections in the brain possess antigenic peculiarities which also influence their susceptibility to salvarsan.

E. H.

LEBEDJEWA (M. N.). Ueber den Einfluss exogener Bedingungen auf den Neurotropismus der Recurrensspirochäten. I. Die Rolle des Traumas im Prozesse der Spirochätenansiedlung im Nervengewebe. [**The Influence of Exogenous Conditions on the Neurotropism of Relapsing Fever Spirochaetes. I. The Rôle of Injury in the Process of Spirochaetes settling in the Nerve Tissue.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1929. Vol. 61. No. 5/6. pp. 505–508. [5 refs.] [Microb. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

The author made experiments to determine whether injury to the brain tissue favoured the development of residual brain infection with *Spirochaeta recurrentis*. The method employed was to pass a fine scalpel into one side of the brain of an infected mouse at the height of infection, but of 21 mice treated in this manner, 18 showed residual brain infections, whilst out of 33 uninjured mice, 28 showed residual infections. It is evident, therefore, that injury to the brain has no influence on the persistence of spirochaetal infection in this organ. [ROSENHOLZ, OWSJANNIKOWA & TREFILOW claimed that brain injury did favour such infections. *Ante*, p. 113.]

E. H.

MANIERI (Alberto) & GORI (Pio). Infezione ricorrente sperimentale nel coniglio. Di un particolare neurotropismo della spirochaeta Duttoni. [**Experimental Infection of Rabbits. Special Neurotropism of** *S. duttoni*.]—*Sperimentale.* 1929. Vol. 83. No. 1. pp. 5–20. [14 refs.] [Inst. of General Path., Univ., Florence].

This paper contains several points of interest. Owing to the fact that spirochaetes are not found in the blood of rabbits after inoculation, most investigators have attributed to this animal a natural immunity to infection. The authors made use of a strain of *S. duttoni* which had been subcultured into white mice over a period of about two years. 5 cc. of a culture of the organisms was inoculated intravenously and at intervals from 15 minutes to 48 hours afterwards the blood was withdrawn and examined by dark-ground illumination and by inoculation into white mice. The results were completely negative. They next injected 5 cc. of citrated blood taken from a rat during an attack. The blood of the rabbit showed spirochaetes in ½ and 1 hour after, and positive results followed injection into white mice from 15 minutes to 4 hours after. Later than this the results were negative.

In the next experiment four inoculations of the blood of an infected rat were made and the rabbit's blood tested in the same way, by dark-ground and by injection into mice. After the first injection the results were practically the same as those just detailed ; after the second all were positive but for a much shorter time, the blood infecting mice only when injected a half to one hour after the rabbit had received inoculation ; after the third, two rabbits out of four showed organisms in the blood microscopically after a half and one hour respectively, and two after half an hour by animal injection ; after the fourth inoculation all were completely negative.

The inference is drawn that repeated inoculation leads to increasing destructive properties in the rabbit's blood. By attempting to cultivate the spirochaetes from the blood after the inoculations the authors found definite indications of lysis of the organisms.

Lastly, series of rabbits were inoculated four times on alternate days with spirochaetes from rats as before, some intravenously, other intraperitoneally; one of each was killed 3, 5, 10, and 15 days respectively after the last injection and the brain, spleen, liver and blood examined by inoculation into mice. In every instance the brain proved to be infective, all the other organs and tissues negative. From this it follows that the spirochaete in question has a definite neurotropism for, whether injected intravenously or intraperitoneally, it tends to locate itself in the cerebral tissue. This fact is considered to have a bearing on the beneficial results of injection of spirochaetes in cases of cerebral syphilis.

H. Harold Scott.

SCHLOSSBERGER (H.) & WICHMANN (F. W.). Experimentelle Untersuchungen ueber *Spirochaeta crocidurae* und *Spirochaeta hispanica.* [**Experimental Studies of** *S. crocidurae* **and** *S. hispanica.*]—*Ztschr. f. Hyg. u. Infektionskr.* 1929. Apr. 8. Vol. 109. No. 3 & 4. pp. 493–507. [Numerous refs.] [State Inst. for Exper. Therapy Frankfurt a. M.]

The authors used a strain of *Spirochaeta crocidurae* obtained from MATHIS in Senegal, and a strain of *S. hispanica* obtained from NICOLLE in Tunis. The course of the infections was studied in rabbits, guineapigs, rats and mice. In the case of *S. crocidurae,* inoculated rats and mice showed spirochaetes in the blood for several days, rabbits only for one or two days in the first attack, and then for brief intervals at the subsequent one or two relapses, whilst guineapigs generally were negative to microscopic examination. However, the blood of these guineapigs was found by subinoculation experiments to contain the infection in the blood for at least 39 days, even in animals that had never shown spirochaetes in the blood. On the contrary, the blood of rats, mice and rabbits, as tested by subinoculation, soon became negative after one or two relapses. Inoculations of *S. hispanica* into these four species of animals was invariably followed by the appearance of spirochaetes in the blood and the development of two or more relapses.

With regard to residual brain infections, in *S. crocidurae* the spirochaetes persisted in the brain of rabbits, mice and rats up to 191 days after inoculation, even when the blood was negative, and in guineapigs 24 to 120 days after inoculation the brain was also found to be infected. With *S. hispanica* residual brain infections were invariably found in rats, guineapigs and rabbits and in 50 to 70 per cent. of inoculated mice. The infection has only a slight pathogenic action in rats, mice and rabbits, but is very pathogenic to guineapigs. Cross immunity experiments showed that *S. crocidurae* is very closely related to *S. duttoni* as shown by NICOLLE & ANDERSON [this *Bulletin,* Vol. 25, p. 596] and MATHIS [*ante,* p. 116]. On the other hand, *S. hispanica* was found to be quite distinct from other strains of relapsing fever. A certain number of rabbits and mice were inoculated with syphilis and subsequently with *S. crocidurae,* whilst in others the order of the infection was reverse. In no instance was any effect observed, syphilitic animals behaving exactly the same as normal ones in the course of infection with relapsing fever, and *vice versa.*

E. H.

TALICE (R. V.) & SURRACO (N.). Sur la culture du *Treponema hispanicum.* [**The Culture of** *Treponema hispanicum.*]—*Ann. Parasit. Humaine et Comparée.* 1929. Mar. 1. Vol. 7. No. 2. pp. 133–139. With 3 charts in text. [5 refs.] [Hyg. Inst., Montevideo.]

An account of the successful cultivation of this spirochaete in a simplified modification of Ungermann's medium [see this *Bulletin,* Vol. 25, p. 595.] The rabbit serum was not inactivated, no blood was added and the cultures were grown anaerobically at 37° C. Under these conditions the spirochaetes were kept *in vitro* for 160 days with 43 passages, without showing any alteration in virulence, as shown by inoculations at various times into 20 experimental animals and 14 human patients.

E. H.

SPARROW (Hélène), LUMBROSO (Ugo) & LAPIDARI (Mario). Etude comparative de quelques spirochètes récurrents par la méthode de l'agglutination. [**Comparative Study of Relapsing Fever Spirochaetes by the Method of Agglutination.**]—*Arch. Inst. Pasteur de Tunis.* 1928. Dec. Vol. 17. No. 4. pp. 279–294. With 7 graphs. [5 refs.]

The authors obtained their immune sera by collecting the blood of animals ten days after they had recovered from an attack of the relapsing fever under examination. Infected blood was used to obtain the spirochaetes, as cultures were found to give very unsatisfactory results.

The authors' results are given in tabular form and with few exceptions agree with the existing views on the distinction of relapsing fever spirochaetes. The reactions were found to be quite specific and are recommended as being easy to use.

E. H.

MURAYAMA (Iseo). [**On the Resisting Power of Spirochaete Recurrens to the Temperature, Light and Darkness.**]—*Okayama-Igakkai-Zasshi* (*Zent. d. Okayama Med. Gesellschaft*). 1929. Jan. Vol. 41. No. 1. pp. 137–151. [7 refs.] [In Japanese. English summary p. 152.] [Dermat. Inst., Univ., Okayama.]

When mice inoculated with relapsing fever spirochaetes were kept in sunlight, the incubation period of the infection was found to be longer than when similar animals were kept in the dark room or in the ordinary laboratory. When the mice were kept at 33°–36° C. the incubation period was the shortest, and as the temperature was lowered to freezing point, the incubation period gradually lengthened.

[No figures are given concerning either the number of animals used in these experiments, or the amount of variation produced in the incubation period by the different conditions of light and temperature.]

E. H.

BRUNNEKREEFT (W. H.) & ONGKIEHONG (H. F.). Broncho-spirochaetosis op Bali. [**Bronchospirochaetosis on Bali Island.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1929. Jan. 21. Vol. 69. No. 1. pp. 29–36. [8 refs.]

Among the Chinese, reporting for treatment of their opium habit, the authors found many cases of broncho-spirochaetosis. Most of

these Chinese were newcomers to Bali and the authors think that they imported the disease into the island. This becomes still more probable by the comparatively frequent occurrence of broncho-spirochaetosis in Balinese women married to Chinese and in other people who have been in contact with Chinese. In people from purely Balinese villages the finding of spirochaetes was uncommon. A short account of the symptomatology and a few case reports (2 chronic and 4 acute cases) contain no novel features. The prognosis of the disease is comparatively good, except in cases wherein complications with malnutrition, acute or chronic infectious diseases may bring on a rapid fatal course.

W. J. Bais.

GIORDANO (Mario). Contributo allo studio sperimentale delle spirochetosi dell' apparato respiratorio. [**Experimental Study of Respiratory Spirochaetosis.**]—*Arch. Ital. Sci. Med. Colon.* 1928. Sept. Vol. 9. No. 9. pp. 517–550. With 15 figs. on 4 plates. [Inst. of Colonial Path., Univ., Bologna.]

The first part of this long article is given up to a detailed description of six cases of pulmonary disease with symptoms of fever (not high, average about 39° C.), cough with purulent and sometimes sanguinolent expectoration, and emaciation. The sputum contained numerous spirochaetes and fusiform bacilli, which diminished gradually in number under treatment and finally disappeared.

H. Harold Scott.

ONORATO (Raffaele). A proposito di spirochetosi dell' apparato respiratorio. [**Remarks on Respiratory Spirochaetosis.**]—*Arch. Ital. Sci. Med. Colon.* 1928. Oct. Vol. 9. No. 10. pp. 581–584.

In this brief paper, or, rather, full note, Professor Onorato refers to the experimental work of GIORDANO and shows how the latter confirms almost entirely his own work done in 1920 on the same subject, the lesions being due to the symbiosis of the *Spirochaeta bronchialis*, or of Vincent's spirillum, with the fusiform organism which he denominates *Bacillus ledanteci*.

H. Harold Scott.

LORANDO (N.). **Cases of Bronchospirochaetosis in Greece.**—*Jl. Trop. Med. & Hyg.* 1929. Apr. 1. Vol. 32. No. 7. pp. 98–99. [8 refs.]

An account of two cases in which the presence of spirochaetes in the sputum, combined with the absence of other pathogenic organisms, led to the diagnosis of bronchial spirochaetosis. Treatment with stovarsol cured the first case.

E. H.

VOIZARD (F. F. E.) & RAULT. La spirochétose respiratoire. [**Bronchial Spirochaetosis.**]—*Arch. Méd. et Pharm. Milit.* 1929. Feb. Vol. 90. No. 2. pp. 179–208. With 1 chart in text. [4 pages of refs.]

A general review of the subject. Nothing original.

E. H.

SILBERSTERN (Ernst). Studien zur Frage der Darmspirochäten. [**The Question of Intestinal Spirochaetes.**]—*Wien. Klin. Wock.* 1929. Mar. 14. Vol. 42. No. 11. pp. 327–331. [5 refs.]

The author gives a useful summary of many previous observations on this subject, and in his introduction gives the results of the examination for gut spirochaetes of a large number of vertebrates. With regard to the possibility of blood spirochaetes invading the gut, mice infected with relapsing fever were killed at various stages of the disease and their alimentary tracts carefully examined, any containing actual red cells being omitted. Spirochaetes were numerous in the stomach, and in fewer numbers were also found in the ileum, caecum, and rectum. Those in the stomach and small intestine seemed to be derived from the blood infection, but those in the caecum and rectum were mostly normal inhabitants of the gut. A few observations are recorded on the effect of mercury poisoning on the gut spirochaetes, supporting the view that mercury has no effect on them [see PARR, this *Bulletin*, Vol. 21, p. 264]. Regarding the examination of infants, spirochaetes were occasionally found in the stools of 7 day old children, whilst others were negative up to the 13th day, and there seems little doubt that the infection must be acquired after birth.

Finally the author describes in detail four cases which all contained very large numbers of intestinal spirochaetes, and discusses the difficult question of their pathogenic significance. In the first two cases the presence of large numbers of spirochaetes in the stools seemed to be a secondary effect, and was associated with the existence of pathogenic Protozoa in the intestine. The other two cases were : (1) a fatal attack simulating acute appendicitis and peritonitis, and (2) a chronic retro-sigmoiditis haemorrhagica which cleared up under treatment, together with the disappearance of spirochaetes. In both these cases the presence of very large numbers of spirochaetes in the intestine suggests the possibility of their pathological significance, although there is no clear evidence on this point.

E. H.

DELAMARE (G.) & GATTI (C.). Spirochètes et tréponèmes d'un granulome vénérien. [**Spirochaetes and Treponemata from a Case of Granuloma venereum.**]—*C.R. Acad. Sci.* 1929. Mar. 18. Vol. 188. No. 12. pp. 885–887. With 4 text figs.

The serous fluid from the plaques of cases of this disease was found to contain numerous spirochaetes belonging to two distinct types. The first type was composed mainly of organisms resembling *S. refringens* var. *balanitidis*, but some approached *eurygyratum*. The second type resembled the fine variety of *S. dentium*, and when stained closely approximated the appearance of *S. pallida*. This association of *S. refringens* and *S. dentium* has been previously recorded and the general conclusion is that it has no pathological significance. The authors tried to infect a monkey with the secretion, but with negative results. The spirochaetes disappeared from the plaques when treated with arsenic, mercury, or bismuth, whilst the granulomatous conditions was unaffected until antimony was used. The authors raise the question as to whether the spiral organisms found in the lesions of cases of syphilis and yaws may not be saprophytes on skin or mucous membrane infected with some virus.

E. H.

NICOLLE (Charles) & ANDERSON (Charles). Un nouveau spirochète récurrent pathogène pour le cobaye *Spirochaeta sogdianum*, transmis par *Ornithodorus papillipes*. [**A New Relapsing Fever Spirochaete,** *S. sogdianum*, **Pathogenic for Guineapigs, transmitted by** *O. papillipes*.] —*Arch. Inst. Pasteur de Tunis.* 1928. Dec. Vol. 17. No. 4. pp. 295–309. With 2 charts in text.

A more detailed account of this spirochaete. [See this *Bulletin, ante,* p. 118.]

NICOLLE (Charles), ANDERSON (Charles) & COLAS-BELCOUR (Jacques). Premiers essais d'adaptation du spirochète des poules à divers ornithodores. [**First Attempts to adapt Fowl Spirochaetes in Various Ornithodorus.**]—*Arch. Inst. Pasteur de Tunis.* 1929. Mar. Vol. 18. No. 1. pp. 53–54.

See this *Bulletin, ante,* p. 118.

E. H.

CICCIMARRA (Gaetano). Sulla spirochetosi intestinale ed eventuali differenze morfologiche colle spirochete buccali e bronchiali.—*Arch. Ital. Sci. Med. Colon.* 1927. Nov. Vol. 8. No. 11. pp. 632–642. [Inst. of Trop. Path., Univ., Bologna.]

DAGNINI (Giovanni) & STROZZI (Tommaso). Sopra un caso di spirochetosi bronchiale. Contributo clinico ed anatomico.—*Riv. di Patol. e Clin. d. Tubercol.* 1928. Dec. 31. Vol. 2. No. 12. pp. 1013–1038. With 3 text figs. & 4 coloured figs. on 2 plates. [96 refs.] [Inst. of Path. Anat., Univ., Bologna.]

FERNÁNDEZ (Julio G.) & CARRI (Miguel Atilio). Broncoespiroquetosis de Castellani a tipo asmatiforme.—*Semana Méd.* 1928. Dec. 6. Vol. 35. No. 49 (1821). pp. 1617–1620.

GHETTI (Giorgio). Immunità e fenomeni allergici nelle spirochetosi umane.—*Arch. Ital. Sci. Med. Colon.* 1928. June. Vol. 9. No. 6. pp. 355–359. [Inst. of Colonial Path., Univ., Bologna.]

NICOLLE (Charles) & ANDERSON (Charles). Unicité des spirochètes du groupe Dutton.—*Arch. Inst. Pasteur de Tunis.* 1928. Dec. Vol. 17. No. 4. pp. 321–326. [1 ref.]

NICOLLE (Charles) & ANDERSON (Charles). Sobre el interés que presentan las investigaciones referentes a espiroquetosis transmitidas por garrapatas para el conocimiento de la patologia del Norte Argentino.—*Prensa Méd. Argentina.* 1929. Mar. 20. Vol. 15. No. 29. pp. 1261–1263.

LEPTOSPIROSES.

i. SANARELLI (G.) & PERGHER (G.). Pathogénie des spirochétoses ictérogènes (premier mémoir). Spirochétoses et microbes de sortie. [**The Pathogenicity of Icterogenic Spirochaetes (First Memoir). Spirochaetoses and Secondary Infections.**]—*Ann. Inst. Pasteur.* 1929. Jan. Vol. 43. No. 1. pp. 89–123. [Numerous refs.]

ii. —— & ——. Pathogénie des spirochétoses ictérogènes (deuxième mémoire). L'action pathogène des microbes de sortie dans les spirochétoses. [**The Pathogenic Action of Secondary Infections in Spirochaetoses.**]—*Ibid.* Apr. No. 4. pp. 420–452. With 8 coloured figs. on 2 double plates. [25 refs.]

i. A further development of the view that spirochaetes in themselves do not produce any obvious pathological effects, but render the host extremely susceptible to the invasion of secondary infections. The first article begins with some remarks on the aetiology of infectious jaundices, with special reference to yellow fever, and the authors seem to be trying to reconcile the observations suggesting that "*Leptospira icteroides*" is the agent of this disease, with the fact that spirochaetal infections are often associated with other diseases. The second part is concerned with the bacteriology of experimental infections with icterogenic spirochaetes and in particular of animals infected with "*Leptospira icteroides*" (Noguchi).

It is shown that young guineapigs and rabbits infected with this organism show varying febrile symptoms which, however, do not seem to exercise any influence on the general health of the animals, as they are found to show a regular increase in weight although large numbers of leptospira may be present in their bodies. In young dogs, not even febrile reactions were observed, suggesting that the leptospira themselves do not manufacture toxins in the blood capable of producing death.

Although the leptospira may be found in large numbers throughout the tissues of infected animals, their action is considered to be mainly mechanical; but they render the host more susceptible to invasion by secondary organisms. When infection with *L. icteroides* is followed by the death of the host, there is usually development of jaundice, preceded by a short hypothermy, and leptospira cannot be found in the blood and organs at death. In these animals, however, it is always possible to recover secondary organisms, which are considered responsible for the death of the host. The presence of large numbers of leptospira in the liver is said to interfere with the functions of this organ, and prevent it exercising its protective rôle against the invasion of secondary infections.

ii. In the second memoir this view is further developed, but the authors find that in some cases when the leptospira is highly virulent, it is possible to detect their pathogenic action in guineapigs without the intervention of secondary organisms. This action, however, is stated to be not very evident, the most characteristic signs being petechiae in the lungs, haemorrhages in the fatty tissue of the lumbar region; and sometimes nephritis with traces of albuminuria. It is possible for the leptospiras to be present in the circulating blood of the guineapig without producing any signs of disease, and in one case they were found 33 days after an intraperitoneal injection. The authors again call

attention to the number of cases of supposed Weil's disease in which leptospira cannot be detected, and also to the fact that the disease can be reproduced in other guineapigs by the inoculation of emulsions of organs in which the specific agent cannot be detected by either microscopical examination or culture.

A strain of *L. icterohaemorrhagiae* in guineapigs was found to be associated with a streptococcus, all but one of the animals dying of septicaemia due to this latter organism. A strain of *S. autumnalis* was found to be associated with a variety of organisms. Finally the authors discuss the histopathology of infections due to leptospira alone and those in which secondary infections have caused a fatal termination.

[Those interested should consult the original articles for the evidence on which the authors base their opinion. The reviewer finds their arguments very unconvincing and some of the statements, particularly those dealing with "*L. icteroides*" and yellow fever, are based on erroneous observations. The statement as to the general presence of secondary organisms in guineapigs dying of infection with *L. icterohaemorrhagiae* is not supported by the experience of Dr. OKELL at the Wellcome Physiological Research Laboratories, who in the routine examination of more than 200 guineapigs, invariably found enormous numbers of leptospira in the livers of animals dying of the disease. Moreover, cultures were made from many of these and no difficulty experienced in obtaining growth of the leptospira without any contaminating organism.]

E. Hindle.

SARDJITO (M.) & ZUELZER (Margarete). Weiterer Beitrag zur Biologie der *Spirochaeta biflexa* syn. *Leptospira icterohaemorrhagiae* syn. *Spirochaeta icterogenes* in den Tropen. [**A Further Study of the Biology of** *Spirochaeta biflexa* **syn.** *Leptospira icterohaemorrhagiae* **syn.** *S. icterogenes* **in the Tropics.**]—*Meded. Dienst d. Volksgezondheid in Nederl.-Indie.* 1928. Vol. 17. Pt. 4. pp. 535–544. [Med. Lab., Weltevreden.]

An interesting study in which an attempt is made to elucidate the conditions influencing the occurrence of the water leptospira, *S. biflexa.* In Europe these spirochaetes are much more restricted in their prevalence and growth than in Sumatra, and also Weil's disease is much less prevalent. On the East Coast of Sumatra, spirochaetes are found in every kind of water, running streams, ponds, etc., and cases of Weil's disease occur the whole year round. In the neighbouring island of Java, the waters on the West Coast were found to be almost free from spirochaetes and also Weil's disease is very rare. Analysis of the waters of the two districts showed that the presence or absence of spirochaetes is correlated with differences in the pH of the water. In Western Java the majority of the waters had a pH of about 6·0, whilst in Sumatra they were generally well above 7·0. The optimum condition for the growth of water spirochaetes seem to be a pH of about 7·3–7·8 or 8·0, combined with a temperature of 28–30° C. These conditions are found in Eastern Sumatra and consequently water spirochaetes and also Weil's disease are common, whilst in Western Java, although the temperature conditions are favourable, the pH of the water is rarely high enough to permit the growth of spirochaetes, and consequently Weil's disease is correspondingly rare.

E. H.

BESSEMANS (A.) & THIRY (U.). Présence, dans l'eau de distribution de la ville de Gand, d'un leptospire pseudo-ictérogène pathogène pour la souris. [**The Presence in the Town Water of Ghent, of a** *pseudo-icterogenes* **Leptospira, Pathogenic for Mice.**]—*C.R. Soc. Biol.* 1928. Dec. 21. Vol. 99. No. 37. pp. 1881–1883. [5 refs.] [Inst. of Hyg. & Bact., Univ., Ghent.]

Cultures of Ghent tap water in Vervoort's medium, covered with a layer of paraffin and kept in the dark at 28° C. were found to contain leptospira after 35 days incubation period. The cultures were heavily contaminated with other organisms, but by subculturing every ten days the culture became both richer and less contaminated. An antiserum was prepared by injecting a rabbit with the contents of these cultures and found to agglutinate *L. icterohaemorrhagiae* as well as the tap water leptospira. On the contrary the lysin reaction, with guineapig complement and fresh or inactivated immune serum, gave specific results. Inoculations into guineapigs gave negative results, so the authors, at the 14th subculture, attempted to infect mice. Out of seven inoculated subcutaneously, four died after 14 to 27 days, and of four inoculated intraperitoneally one died after 11 days. Subinoculations into other mice were successful and the mice died after 25 to 29 days. The infected mice showed leptospira in the blood and urine and from the second week the animals were obviously ill. At autopsy, the organisms were recovered in pure culture from the bladder, and they were common in the kidney though absent from other organs. Inoculation of these organisms into guineapigs gave negative results, although mice could be infected.

[These results support ZUELZER's view that the ordinary water leptospira may acquire pathogenic properties—see this *Bulletin*, Vol. 25, p. 602.]

E. H.

DARGEIN & BIDEAU. Un cas de spirochétose ictérohémorragique. [**A Case of Spirochaetal Jaundice.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1929. Mar. 25. 3rd Ser. Year 45. No. 10. pp. 403–404.

The record of a case of this disease in a sailor. On the seventh day of the disease a guineapig was inoculated with the sediment from 20 cc. of centrifuged urine and died of typical infectious jaundice 13 days later. Spirochaetes were present in films from this animal but were not found in the *inoculum*. Two other guineapigs inoculated, one at the same time as the urine, and the other 10 days later with the blood of the patient, remained uninfected.

E. H.

AUBERTIN (Ch.) & POUMAILLOUX (M.). Spirochétose ictérohémorragique mortelle d'origine hydrique. [**Fatal Spirochaetal Jaundice of Aquatic Origin.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1929. Feb. 4. Year 45. 3rd Ser. No. 3. pp. 114–119. [5 refs.]

The description of a fatal case of this disease. Spirochaetes were not found and inoculation into a guineapig gave negative results, but the patient's blood agglutinated *Leptospira icterohaemorrhagiae*.

E. H.

TIXIER (Léon) & DE SÈZE (Stanislas). Un nouveau cas de spirochétose ictéro-hémorragique professionnelle d'origine fluviale certaine. Inoculation au cobaye négative à la recrudescence. [**A New Case of Spirochaetal Jaundice of Aquatic Origin. At Relapse, Inoculation into Guineapig Negative.**]—*Bull. et Mém. Soc. Méd. Hôpit, de Paris.* 1929. Jan. 21. Year 45. 3rd Ser. No. 1. pp. 17–19.

The record of a case at Paris of this disease, the nature of which was confirmed by sero-diagnosis.

E. H.

KATHE (H.). Ueber das sogenannte Schlammfieber. [**On So-called Slime Fever.**]—*Cent. f. Bakt.* I. Abt. Orig. 1929. Vol. 110. Beiheft. No. 6/8. pp. 54*–56*.

The author considers that this is an abortive form of Weil's disease, as indicated in his previous publication [*ante*, p. 132].

E. H.

UHLENHUTH & SEIFFERT. Zur Wismuttherapie der Weilschen Krankheit. [**Bismuth Therapy in Weil's Disease.**]—*Cent. f. Bakt.* I. Abt. Orig. 1929. Vol. 110. Beiheft. No. 6/8. pp. 47*–53*.

An extension of the authors' paper reviewed in this *Bulletin*, Vol. 25, p. 609. Details are given of the results of treating guineapigs infected with a virulent strain of leptospira, by means of bismuth yatren A and B respectively, embial, bisuspen, bismogenol, and trepol or neotrepol. The first of these was found to be the best, but some of the others also had a curative effect, with the exception of embial and bisuspen which were too poisonous for use. As previously recorded bismuth yatren A, administered at the appropriate stage of the disease, cured all the treated guineapigs. With reference to treatment by means of repeated small doses, it was found that two injections each of half the curative dose, separated by an interval of four days, were effective. Yet smaller doses may be employed, for a series of guineapigs were cured by six injections each of a quarter the curative dose or less. Bismuth yatren A and neotrepol were found to have little effect when administered as a prophylactic; bismogenol, on the other hand, when administered the day before percutaneous or intraperitoneal inoculations of the spirochaete, protected the animals against infection.

The mechanism of bismuth therapy is found to depend on an indirect action on the spirochaetes, enabling the body to build up immune bodies against the infection.

E. H.

ZIMMERMANN (E.). Aktive und passive Immunisierung gegen Weilsche Krankheit bei normalen und blockierten Meerschweinchen. [**Active and Passive Immunization against Weil's Disease in Normal Guineapigs and those with the Reticulo-Endothelial System blocked.**]—*Cent. f. Bakt.* I. Abt. Orig. 1929. Vol. 110. Beiheft. No. 6-8. pp. 235*-238*.

A study of the persistence of immunity in UHLENHUTH and SEIFFERT's guineapigs cured of Weil's disease by bismuth [see above],

showed that animals treated on the 5th or 6th day of infection were immune after 75 days or longer, for only 1 out of 15 succumbed to a second inoculation. Other guineapigs treated prophylactically with bismuth, or on the second day of infection were less resistant, for after a similar interval of 75 days or more, 7 out of 16 succumbed to a re-infection. In some guineapigs the author removed the spleen and blocked the endothelial system by the intracardial injection of 1 cc. of 30 per cent. ferric saccharate solution. These animals were inoculated with the disease two days later and then treated with immune serum. No difference was observed in the results obtained compared with normal guineapigs similarly infected and cured. In the same way " blocked " guineapigs were infected and cured by bismuth yatren A and subsequently tested for persistence of immunity. The results show that blockage of the endothelial system has no action on the development of passive immunity nor on the active immunity following treatment with bismuth, nor on the persistence of such immunity.

E. H.

McKinley (Earl B.). *Leptospira icterohaemorrhagiae* **in Wild Rats of the Philippine Islands.**—*Proc. Soc. Experim. Biol. & Med.* 1928. Oct. Vol. 26. No. 1. pp. 26–28. [8 refs.] [Bureau of Science, Manila.]

Examination for leptospira in the wild rats of the Philippines was conducted on 250 rats and the only positive result was obtained by the inoculation of the pooled blood of 6 animals into a guineapig. The author estimates that probably not more than 1 per cent. are infected, and this is in harmony with the rarity of infectious jaundice in that region.

E. H.

Tarassow (S. I.). Zur Frage der epidemiologischen Vorbedingungen für die Weilsche Krankheit in Moskau. [**The Question of Epidemiological Conditions for Weil's Disease in Moscow.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1929. May. Vol. 33. No. 5. pp. 282–283. [" Metschnikoff " Inst. for Infectious Diseases, Moscow.]

The examination of wild rats resulted in forms resembling spirochaetes being found in the kidneys, but cultures of them were not obtained. The examination of Moscow tap water resulted in finding leptospira which were obtained in pure culture.

E. H.

RAT-BITE FEVER.

KUIPERS (F. C.). Bijdrage tot de pathogenesis van de rattebeetziekte. [**Contribution to the Pathogenesis of Rat-Bite Fever.**]—*Nederl. Tijdschr. v. Geneesk.* 1929. Mar. 16. 72nd Year. 1st Half. No. 11. pp. 1346–1358. With 1 chart in text. [27 refs.]

No cyclic alterations are known in the life of *Spirillum minus.* Therefore the cyclic course of rat-bite-fever is to be ascribed either to a periodical rise in the production of toxins or to a periodical alteration in the relation between the toxins and the bodily resistance of the patient. The regular anacritical rise of the number of eosinophiles found in the case described above is a reaction to some substances produced by the infection. This likeness of rat-bite-fever with allergic conditions induced the author to make a comparison with such diseases. It is impossible to follow the argument in a summary, but the author finally develops the following theory.

After the infecting bite the Spirillum multiplies, the toxins are absorbed and the body sensitized. The incubation will be shorter, if the number of spirilla and their virulence is greater. Now the toxin acts as an allergen. Besides the free antibodies, produced by the patient's organism, antibodies will be fixed to the cells of the terminal blood vessels at the site of the infection and in case of general sensitization to the cells of the cutaneous vascular apparatus. During the attacks the allergen is bound by the sessile antibodies. The constitution of the patient, his preparedness to the development of allergic conditions may determine the clinical type of the disease.

In analogy with other allergic diseases it is probable that there is a constant production of toxins by the spirillum.

W. J. Bais.

KUIPERS (F. C.) & RUYS (A. Charlotte). Een geval van rattebeetziekte. [**A Case of Rat-Bite Fever.**]—*Nederl. Tijdschr. v. Geneesk.* 1929. Mar. 9. 72nd Year. 1st Half. No. 10. pp. 1207–1220. With 2 charts & 4 figs. on 1 plate. [18 refs.]

A case of rat-bite fever is described in a boy of 9, following a bite in the finger as subsequently found out, but at first offering considerable diagnostic difficulties, especially in view of the total absence of local symptoms and rash, recurrent fever being the only symptom. Yet the diagnosis was established by the infection with *Spirillum minus* of mice inoculated with the patient's blood. The desirability is emphasized of performing such diagnostic inoculations with blood taken from the patient a short time after the temperature has commenced to fall.

During about 4 months the patient's leucocytes were counted daily and the results of these observations are presented in graphic form. Leucocytosis with relative lymphopenia and aneosinophilia was found during the attacks. The number of eosinophiles rose markedly a few days before the attacks. Eosinophilia occurred during convalescence. The regularity of these alterations in the blood picture and their occurrence for some time after the clinical symptoms had subsided, justify the authors' statement that after recovery from rat-bite-fever, attacks still occur which remain under the clinical threshold. The patient recovered after arsphenamin treatment.

This case is the eighth of rat-bite fever observed in Holland, and the second in which the presence of the causative agent was demonstrated.

W. J. Bais.

AUBREY (G. E.). **Rat-Bite Fever in Hong-Kong.** [Memoranda.]—*Brit. Med. Jl.* 1928. Dec. 29. p. 1177.

The record of a case of this disease, diagnosed on clinical grounds, in a Chinese man in Hongkong, the first to be recorded from that region. The symptoms disappeared after the injection of arsenicals.

E. Hindle.

DE-VECCHI (Gino). Un caso di sodòku. [**A Case of Rat-Bite Fever.**]—*Policlinico.* Sez. Prat. 1928. Dec. 3. Vol. 35. No. 48. pp. 2389–2390. [10 refs.]

A girl of 17 years, bitten on the right side of the forehead by a rat, and three days later a second time on the right cheek, when sleeping in an infested building. The fever started a week later and yielded readily to injections of Neojacol (? arsenobenzol) intramuscularly, in doses of 0·15, 0·3, and 0·3 gm., at seven days' interval.

H. Harold Scott.

GELONESI (G.). Un importante caso di sodòku. [**A Case of Rat-bite Fever.**]—*Arch. Ital. Sci. Med. Colon.* 1927. Oct. Vol. 8. No. 10. pp. 571–576. With 1 text fig.

This case is recorded for two reasons. First, because the rash which was originally papular became vesicular; secondly, puncture of an enlarged femoral gland yielded fluid in which the long form of the Spirillum, 8–10 microns in length with 4–5 undulations, was seen.

H. Harold Scott.

HERSHFIELD (Alex S.), KIBLER (O. A.), COLBY (Selma), KOENIG (M.T.), SCHMID (O. W.) & SAUNDERS (Anny Marea). **Sodoku Treatment in Paresis. Preliminary Report on Seventy-Two Cases.**—*Jl. Amer. Med. Assoc.* 1929. Mar. 9. Vol. 92. No. 10. pp. 772–773. [1 ref.]

A record of the use of *Spirillum minus* for the treatment of 72 cases of paresis. After a year 50 per cent. of the patients were found to be more or less physically improved; 20 per cent. showed slight to marked mental improvement; 10 per cent. at first showed mental improvement, and subsequently became worse. Ten patients died during the treatment, of which only two deaths are attributed to the rat-bite fever infection. The authors' observations indicate that the height of fever did not have any bearing on the degree of improvement, for many patients with a moderate fever curve showed better mental improvement than those with excessive temperatures. Physical improvement occurred before mental, and many patients weighed more after the treatment than for many years previous.

E. H.

SCHWARZMANN (L.). Zur Frage der ätiotropen Therapie der experimentellen Sodoku (Rattenbisskrankheit). [**The Question of Aetiotropic Therapy in Experimental Rat-Bite Fever.**]—*Zent. f. Bakt.* I. Abt. Orig. 1929. May 10. Vol. 112. No. 1/2. pp. 60–66. [17 refs.] [Microb. Research Inst., Education Commissariat R.S.F.S.R., Moscow.]

The author treated mice infected with rat-bite fever by means of salvarsan injections. The spirilla disappeared from the circulation after

treatment, but relapses occurred in at least 75 per cent. of these animals This observation would suggest that the spirochaete in mice is resistant against salvarsan. On the strength of his observations the author is of the opinion that this disease is caused by a true spirochaete, *Spirochaetæ morsus muris*, which bears no relation to the Spirillum present in the blood of mice. This latter organism is considered as probably the only one appearing in the relapses, as the former is supposed to be eradicated by the salvarsan.

E. H.

MELKERSSON (E.). Om råttbettssjukan. Med anledning av ett fall i Göteborg.—*Hygiea.* 1929. Apr. 30. Vol. 91. No. 8. pp. 318–329. With 1 chart in text. [14 refs.]

PARMANAND (M. J.). A Note on *Spirillum minus* (Carter), the Causative Organism of Rat-Bite Fever.—*Indian Med. Gaz.* 1929. Apr. Vol. 64. No. 4. pp. 190–191. With 1 plate. [10 refs.]

POGGI (Igino). Sul sodòku eventuale reperto di spirochete nella bocca dei *Mus decumanus.*—*Arch. Ital. Sci. Med. Colon.* 1927. Sept. & Oct. Vol 8. Nos. 9 & 10. pp. 533–547; 559–570. With 3 text figs. [30 refs.] [Inst. of Trop. Path., Univ., Bologna.]

TROPICAL DERMATOLOGY.

GUPTA (A.). **My Experience about Dermatology in the Tropics.**—*Far Eastern Assoc. Trop. Med. Trans. Seventh Congress, British India, 1927.* Vol. 1. pp. 129–135.

"My main object . . . was to remove the vague impression that exists in our minds that tropical dermatology is entirely different from western dermatology." Certain diseases common in England are rare in India, e.g., infection with *Microsporon audouini* and Lupus vulgaris, the low incidence of the latter probably being due to the sunlight. Scrofulodermia is sometimes seen, whilst psoriasis is uncommon and is much modified by the actinic rays. It must also be remembered that most lesions are secondarily infected with pyogenic organisms to an extreme degree. This is partly due to the heat, which keeps both the areas moist and the patients lethargic. For the same reason dermatomycoses are far more common than they are in the west, whilst the varieties of infecting fungi are far greater in number. Diseases of nervous origin are comparatively rare (e.g., Alopecia areata and Lichen planus), whilst the only trade dermatitis cases so far recognized have been due to jute, iodoform, *Semecarpus anacardium*, teakwood, and umbrella-polish.

Leucoderma is common and may appear after local irritation, e.g., any dermatitis, the wearing of a tight belt, etc. The author inclines to the view that the cause is not to be found among the endocrine glands but in the intestinal tract. The best treatment is the local application of "babchi," prepared from the seeds of *Psoralea corylifolia*.

The following conditions are described as being new in the author's experience :—

(1) A variety of chromokeratosis, seen as cayenne-pepper-like staining of the dorsa of the hands.

(2) Domed papules, the size of a split pea and dark in tint, which appear on the extensor surfaces of the elbows and knees in winter and which disappear in summer.

(3) Similar papules, more generalized and showing no seasonal variation. They are common in oil workers and are probably due to an oil folliculitis.

(4) Granulomatous lesions deemed to be "septic" in origin.

(5) A melanodermia of the face which has a butterfly distribution and which varies in intensity spontaneously.

(6) A localized melanodermia, common on the neck.

(7) Generalized melanodermica which includes the mucosa. It may start anywhere and then spreads gradually. There is no obvious cause and it is not influenced by treatment.

M. Sydney Thomson.

BLOCH (Bruno). **The Rôle of Idiosyncrasy and Allergy in Dermatology.**—*Arch. Dermat. & Syph.* 1929. Feb. Vol. 19. No. 2. pp. 175–197. With 9 text figs.

"The word allergic is here applied . . . to eczema, eruptions caused by the use of drugs, urticaria, Quincke's oedema and to other diseases which are not of the skin, such as serum sickness, asthma and hay-fever. . . . This recent development is remarkable because until a short time

ago allergic processes could be assumed only in diseases caused by living organisms or foreign proteins." The author bases his own definition of allergy on clinical pathology: "that state which has as its basis the property of certain groups of cells (organs) of the living organism to react in a specific manner when brought in contact with a substance which is, as far as is known, foreign to the organ or cells; the characteristic of this specific pathologic process lies in the fact that it is caused by the reaction of this exogenous substance with its specific cellular fixed antibody. The basis and the essence of allergy is the ability of the living cell to react with the production of specific antibodies to the stimulus of foreign substances, which are therefore called antigens, as well as the fact that the contact of the antigen with its specific cellular fixed antibody causes a disturbance of cellular life which usually results in an inflammatory reaction."

The type and course of the allergic reaction are independent of the nature of the antigen but vary according to the localization of the antibody, that is, according to which organ reacts to the antigen. Antibodies which are formed by and usually adhere to the cell can become free in the blood and still keep their power of specific reaction with their particular antigen. The possibility of desensitization partly depends on their presence, whilst their rôle in diagnosis is equally important, as their demonstration enables it to be said with certainty that one is dealing with a true allergic process. In Bloch's opinion the most efficient of these methods is that devised by PRAUSNITZ and KÜSTNER and by its use it has been proved that non-protein antigens do exist. After referring to experiments which demonstrate that asthma, hay-fever, toxicoderma, urticaria and serum disease are allergic reactions, the author deals more particularly with the problem of eczema. "It is certain that there is not the least evidence of a metabolic disturbance which is common to all or to many types of eczema and which is pathognomonic for this condition of the skin. . . . The more pains one takes in the effort to find the cause in cases of eczema as regards both the history and the functional tests, the more exogenous factors will be found as the real bases for this disease." In his skin tests Bloch uses eczematous substances instead of foodstuffs (e.g., 1 per cent. solutions of formaldehyde, sublimate, quinine hydrochloride, etc., and iodoform, primrose leaf, adhesive plaster, etc.) and such special substances as seem indicated (e.g., fur in suspected fur eczema). These substances are placed on the intact skin and held in place by linen, gutta percha and adhesive tape, the results being read 24 hours later and only those giving a definite *eczematous* reaction are read as positive. The sensitivity may be mono- or polyvalent and may be positive only in certain regions of the body (hence the importance of using healed areas for the tests). "In principle a difference does not exist between the so-called artificial eczematous dermatitis and true eczema." Eczema can also be produced by the ingestion of an eczematous substance and therefore there probably do exist some endogenous causes. There is no qualitative relationship between the nature of any causative agent and the nature of the reaction to which it gives rise.

It is pointed out that at one time it was thought that the presence of an individual hereditary disposition was requisite for "idiosyncrasiogens" to create a reaction. Actually the percentage of idiosyncratic persons varies greatly according to which substance is employed as the agent. Also it is possible to render a normal person sensitive to primula by painting the skin with a concentrated extract of the plant, i.e.,

typical idiosyncrasy has been converted into an allergy. Attempts to demonstrate antibodies in the serum of persons with *eczematous* idiosyncrasies have *all* been negative, whereas the transference is easy in other types. This may be because it is exceptional for the antibodies to become free in eczema cases, and this would also explain why desensitization and immunity are difficult to obtain in such patients. It is, however, still necessary to study possible influences of the sympathetic system and hormones, for perhaps only a part of these manifestations have an allergic basis.

M. S. T.

KLAUDER (Joseph V.). **Clinical Aspects of Allergy in Dermatology.**—*Arch. Dermat. & Syph.* 1929. Feb. Vol. 19. No. 2. pp. 198–217. With 4 text figs. [46 refs.]

In this article the meaning of allergy is limited to hypersensitiveness, the clinical phases being divided into two groups, one in which the sensitizing substances are the cause of the patient's symptoms and the other in which they are not the cause (i.e., conditions giving non-specific cutaneous reactions). This is fully illustrated by a diagram. The skin diseases in which the author regards the evidence as inconclusive are Besnier's prurigo and Czerny's exudative diathesis. The first or conclusive group is further subdivided into those affections resulting from cutaneous hypersensitiveness only (dermatitis and pruritus), those resulting from somatic hypersensitiveness only (eczema, urticaria, angioneurotic oedema, erythema multiforme, drug rashes), and those resulting from combined cutaneous and somatic hypersensitivity (serum sickness, eczema, urticaria, angioneurotic oedema and pruritus associated with hay-fever or asthma). Each condition is then discussed in some detail and five interesting cases are reported in full.

This article and the paper by BLOCH were read at a meeting of the American Dermatological Association in April 1928. The ensuing discussion is also reported in full and the whole will well repay careful study by those interested in this subject.

M. S. T.

DA FONSECA (Olympio Oliveira Ribeiro). Algumas considerações de ordem geral sobre as dermatomycoses. [**General Remarks on Dermatomycoses.**]—*Sciencia Med.* 1928. Nov. Vol. 6. No. 11. pp. 565–569.

Lesions due to Microsporon and Trichophyton are fairly common in Brazil. Associated with them and also with other cutaneous affections, though not always producing lesions of themselves, there have been met with species of Hormodendrum, Cladosporium, Aspergillus, Penicillium, Scopulariopsis and Spicaria.

H. Harold Scott.

FRIED (S. M.) & SEGAL (M. B.). **The Hematogenous Production of Dermatomycoses: Experimental Studies.**—*Arch. Dermat. & Syph.* 1929. Jan. Vol. 19. No. 1. pp. 98–104. [18 refs.]

After describing in sufficient detail previous work which has been done along these lines, the authors give a full account of their own experiments, *Trichophyton gypseum* being the fungus used. Great care has

been used to prevent any possible fallacies which might have risen from technical errors or accident. They used 29 animals (mostly rabbits) and in 11, i.e., 38 per cent., positive results were obtained. An area on the back or side was shaved and scarified and an emulsion of spores was introduced into a vein. After an incubation period of 12–18 days, lesions appeared on the scarified areas only, these being situated on the flanks and carefully guarded from contact with the sites of intravenous inoculation. The disease lasted from 6–12 weeks and the amount of material injected had no apparent influence on the character of the lesions. It is suggested that the scarification leads to local inflammation and during this reaction the spores are able to pass through the capillary endothelium which is normally an impenetrable barrier. There is also a definite elective rôle of the fungus towards the skin.

A second series of experiments, in which blood was taken from the heart at varying periods after the original intravenous injection, proved that the bulk of the parasite disappears from the blood within 24 hours; some spores may, however, circulate for as long as 3 days.

M. S. T.

JOHNS (Foster M.). **Fungus Infections of the Hands and Feet.**—*New Orleans Med. & Surg. Jl.* 1929. Feb. Vol. 81. No. 8. pp. 527–532. With 25 figs. on 2 plates. [4 refs.] [School of Med., Tulane Univ., Louisiana.]

The author considers that fungi are much more commonly concerned in the production of lesions of the exposed parts of the body than is usually believed and insists that the nails are the foci from which repeated re-infections occur. He gives a simplified classification of these organisms and describes the various clinical types of eruption produced by representatives of the different genera. The following method has been devised to determine the presence of fungi. As much diseased tissue as can be conveniently obtained is digested with 10 per cent. sodium hydroxide for 12 to 18 hours at body temperature. The resulting fluid is thoroughly shaken with 2 volumes of ether and the whole then centrifuged for several minutes. The detritus containing the spores and mycelia collects between the two layers of fluid, which are then removed by decantation. The detritus is then shaken with water and centrifuged once more, after which the sediment is ready for microscopical examination. Many of the figures are excellent.

M. S. T.

SHARP (William B.) & TAYLOR (Evelyn Kerns). **Interdigital Ringworm Control among Students.**—*Jl. Preventive Med.* 1928. Nov. Vol. 2. No. 6. pp. 485–491. [19 refs.] [Dept. Bact. & Preventive Med., Univ., Texas & Health Service, Univ., Chicago.]

This investigation was carried out among University students in Texas. In the first place 278 men were asked to complete a written catechism and from their answers it was computed that 46 per cent. had been infected. Among 181 women similarly questioned 32 per cent. proved to be the corresponding figure. A third group of 220 men were examined clinically and orally, 35 per cent. giving positive results. It is stated that only definite cases are included in these figures. It was

further found that 46 per cent. of those who were in the habit of walking barefoot about the gymnasia were infected, whilst 36 per cent. of those who wore shoes had contracted the disease. Scales from the toes and groins were kept for 1–2 years and efforts were then made to obtain cultures, but without success. The conclusion is reached that private rooms act as a source of transmission in even less degree than do public floors. An attempt was made to carry out mass treatment with Whitfield's ointment and as a result the authors are of the definite opinion that the feet were kept healthier thereby, although circumstances naturally precluded exact information. The seasonal incidence in June, July and August was very marked in these epidermophyton cases, other varieties of ringworm seen showing no such variation. It is deduced that there is no reason to expect improvement in the prevalence of the disease by means of floor sanitation and foot hygiene. The best methods by which it may be checked are probably the dissemination of information to the public and physical examination.

During this enquiry there was discovered a pathogenic fungus which apparently constitutes a new variety. It was found in 2 toe cases and in 1 pubic case at Galveston, Texas. Microscopically it had swollen clubs and filaments, intercalary chlamydospores and a few brownish, blunt aerial fuseaux. The colony itself is larger than is a corresponding growth of *E. inguinale*, whilst it is also more downy and of a different colour. There is a central button with 3 or 4 radiating convolutions, the whole having a diameter of 5 cm. on the primary medium (this contained crude malt and "Difco," a proprietary preparation of peptone). The centre has a buff tint and is surrounded by a pale green inner zone, this in turn being surrounded by a cream outer zone. Older cultures take on a tint resemblng dark tan and are covered with flakes of brown.

M. S .T.

CASTELLANI (Aldo). **Further Observations on the Treatment of Epidermophytosis of Toes (Mango Toe) and Certain Other Forms of Epidermophytosis by a Fuchsin Paint.**—*Jl. Trop. Med. & Hyg.* 1929. Mar. 15. Vol. 32. No. 6. pp. 77–79. [2 refs.] [Ross Inst., London, and Tulane Univ., New Orleans.]

"The paint is the ordinary carbol-fuchsin used in bacteriological laboratories for staining tubercle bacilli, to which 1 per cent. of boric acid and 5 per cent. acetone and 10 per cent. resorcin have been added." Good results are claimed from daily applications of this paint, particularly in foot cases and when secondary infection is present. It is also useful in other forms of epidermophytosis, particularly when there is a moist eczematous reaction to the infection.

M. S. T.

CATANEI (A.). Etude des teignes dans le Sud Oranais (Algérie). [**On Ringworm in Southern Oran.**]—*Bull. Soc. Path. Exot.* 1928. Nov. 14. Vol. 21. No. 9. pp. 729–735. [1 ref.] [Pasteur Inst., Algiers.]

The author has investigated the incidence of ringworm among the native children inhabiting this part of Africa. Clinical, microscopical and, where possible, cultural examinations were carried out. A total of 694 were inspected, most of them being of Berber, Arab and Negroid

extraction, but 107 were Jewish. A total of 212, or 30·5 per cent., were found to be infected, and of these 110 showed favus and 102 trichophyta. The latter were most common between the ages of 5 and 10 years, whilst the lighter races were more affected than were the negroes. No lesions were ever found on the face, hands or nails. Of the 95 cases in which it was possible to make cultures 88 proved to be *T. violaceum* and 7 a fungus very similar to *T. glabrum*. Favus was mostly seen between the ages of 10 and 15 years, 27 cases only showing typical "cups." Cultures were obtained from 32 cases, all being *Achorion schönleinii*. It is noteworthy that no instance of microsporon infection was detected.

M. S. T.

CATANEI (A.). Les teignes du cuir chevelu chez les indigènes des environs d'Alger. [**Ringworm of the Scalp among the Natives near Algiers.**]—*Bull. Soc. Path. Exot.* 1929. Feb. 13. Vol. 22. No. 2. pp. 60–64. [1 ref.] [Pasteur Inst., Algiers.]

A total of 770 patients under the age of 16 years were examined, the work being carried out along the same lines as were adopted in Oran. Of these, 80 were infected; 56 with trichophyta and the remainder with favus. No cases were observed below the age of 1, whilst 57 were seen between the ages of 6 and 10, boys being more affected than girls. Cultures revealed *A. schönleinii* or *T. glabrum* in the great majority of patients, but a few infections with *T. violaceum* and one with *T. sulfureum* were also found.

M. S. T.

ACTON (Hugh W.) & MCGUIRE (C.). **"Cooly Itch." A Purulent Folliculitis due to the** *Trichophyton violaceum* **Variety** *Indicum*.—*Indian Med. Gaz.* 1929. May. Vol. 64. No. 5. pp. 241–246. With 8 plates (3 coloured). [2 refs.]

This important article separates a clinical entity from the many forms of purulent dermatitis which have been carelessly designated "cooly itch." It is characterized by follicular pustules with surrounding induration and inflammation, this causing a peculiar purplish coloration round each hair. There is marked irritation and secondary staphylococcal infection. The eruption is particularly common on the legs, but may affect all hairs except those of the scalp; occasionally, however, it may even spread to these by extension from the beard. The authors have isolated a variety of *T. violaceum* which differs from the original only in cultural appearances. Full details are given of the methods of cultivation, morphology, etc. The disease is common among lower class Indians and is spread very greatly by contact and friction, e.g., the cross rub of clothes and wrestling. Occasionally it is seen in seafaring Europeans who are accustomed to walking about decks barefooted. Frequent dressings with a 5 per cent. solution of gentian violet form an efficient treatment, but in very indurated cases epilatory doses of X-rays may be necessary. The paper is amply and well illustrated.

M. S. T.

SARTORY (A. & R.), MARCEL & MEYER (Jacques). Contribution à l'étude des mycétones : un nouveau cas d'actinomycose à grains jaunes. [**Actinomycosis with Yellow Granules.**]—*C.R. Acad. Sci.* 1929. Mar. 4. Vol. 188. No. 10. pp. 745–747. [3 refs.]

The case described is that of a young man who presented a painful and oedematous swelling of the tibia just below the anterior tubercle. Incision revealed a cavity filled with softened fragments of bone, hard granulations and a yellow viscous fluid. Radiography showed an area of decalcification which might well be confused with tuberculosis. A full account is given of the histology, staining and cultural characteristics of the organism found ; it proved to be closely related to *Act. asteroides* and it is proposed to name it " var. *serratus*." Stress is laid on the fact that this infection occurred without any apparent involvement of the respiratory or intestinal tracts. Local and internal treatment with iodine compounds was completely successful.

M. S. T.

DELAMARE (G.) & GATTI (C.). Mycétome du pied à grains blancs. [**Mycetoma with White Particles.**]—*Bull. Acad. Méd.* 1929. Feb. 19. 3rd Ser. Year 93. Vol. 101. No. 7. pp. 273–278. With 2 text figs.

The case, which is very fully described in this paper, definitely proves the existence of mycetoma in Paraguay. Stress is laid on the small size of the nodules and sinuses, whilst the dorsum of the foot showed an inelastic band of brownish-black pigmentation suggestive of scleroderma.

M. S. T.

SILVESTRO (Lottico). Su due casi di mycetoma in Tripolitania. [**Two Cases of Mycetoma in Tripolitania.**]—*Arch. Ital. Sci. Med. Colon.* 1928. May. Vol. 9. No. 5. pp. 281–287. With 3 text figs. [Inst. of Trop. Path., Univ., Bologna.]

The first was a man of 60 years with Madura foot. The condition had existed for a considerable time and secondary glandular involvement had occurred. Amputation was performed, but the patient died. The second was a man of 55 years or so with a mycetomatous affection of the right hand [according to the text, but the photograph given is of the left hand]. This patient was seen earlier and operative measures proved successful.

H. Harold Scott.

DELAMARE (G.) & GATTI (C.). La piedra del Paraguay. [**Paraguayan Piedra.**]—*An. Facul. de Ciencias Méd.* Asunción. 1928. Aug. & Oct. Vol. 2. No. 7 & 8. pp. 10–33. With 32 figs. on 3 plates. [18 refs.]

Piedra of Paraguay is due to a different Trichosporon from that of Colombia. That causing the Colombian form is *T. giganteum.* That of Paraguayan piedra is *T. hortai*, but differs slightly from the type species in that the cysts possess 6–12 bodies in place of 8 ; it is therefore designated *T. paraguayo*, although only a variety of *T. hortai*. Colonies grow more rapidly on Sabouraud maltose than on glucose, and by the tenth day have a greenish periphery and the centre is mammillated.

H. Harold Scott.

DELAMARE (G.) & GATTI (C.). Caractère *neoendothrix* de la "piédra paraguayenne." [**Neo-Endothrix Fungus in Piedra.**]—*C. R. Soc. Biol.* 1929. Jan. 18. Vol. 100. No. 2. pp. 122–124. With 6 text figs. [Med. Clinic, Faculty of Med., Asuncion.]

The authors state that by appropriate clarification of fair hairs from a case of piedra it is possible to see that the Paraguayan variety at least starts inside the cuticle and is due to a Neo-endothrix (Sabouraud). Full details of the microscopical appearances are given, but the accompanying photographs are poor.

M. S. T.

CASTELLANI (Aldo). **A Pseudomycosis due to a Coccus:** *Micrococcus myceticus.—Arch. Dermat. & Syph.* 1928. Dec. Vol. 18. No. 6. pp. 857–861. With 2 text figs.

A complete account is given of all the features characteristic of this coccus. The morphologic, staining, cultural and biochemical properties are included together with a table of its sugar reactions. Subcutaneous injection into rabbits produces a localized nodule which softens and later discharges pus. The first figure gives an excellent picture of the lesions produced in human beings. These are chronic suppurative areas with nodulation, sinuses and a centrifugal spread, at times suggestive of gummata. The only treatment which has so far proved efficient is a vaccine prepared from various strains of the organism.

M. S. T.

NEVES (Aroeira). Onychomycose (?) por "Acrotheca Pedrosoi" (Brumpt), 1921. [**Onychia associated with "Acrotheca Pedrosoi" (Brumpt), 1921.**]—*Brasil-Medico.* 1929. Jan. 19. Vol. 43. No. 3. pp. 69–70. With 1 text fig. [Oswaldo Cruz Inst., Rio de Janeiro.]

A man of 48 years suffering from onychia. *Acrotheca pedrosoi* was cultivated on Sabouraud glucose and maltose, but the author was unable to determine whether it was actually causative or merely a parasitic concomitant.

H. Harold Scott.

GIORDANO (M.). Di un caso di dermatomicosi da *Penicillium crustaceum.* [**Dermatomycosis due to** *Penicillium crustaceum.*]—*Arch. Ital. Sci. Med. Colon.* 1928. July. Vol. 9. No. 7. pp. 397–400. With 1 text fig. [Inst. of Trop. Path., Univ., Bologna.]

A boy of 12 years, born in the Sudan but living from a very early age in Tripoli, presented numerous pale areas scattered over the body, but chiefly in the region of the ankles; they were rounded, but with irregular margin, varying in size from that of a lentil to a two-lira piece. Culture on Sabouraud-maltose yielded a Penicillium identified by Professor SANFELICE as *P. crustaceum.* Treatment with salicylic acid has greatly improved the condition and cure is expected.

H. Harold Scott.

GOMES (J. M.) & PESSOA (Samuel B.). Reproducçao experimental da dermatite verrucosa. [**Experimental Reproduction of Dermatitis Verrucosa.**]—*Brasil-Medico.* 1929. Mar. 9. Vol. 43. No. 10. pp. 255–257. With 6 text figs. English summary p. 257. [Hyg. Inst., Sao Paulo.]

In Brazil a dermatitis verrucosa is caused by the fungus *Acrotheca pedrosi*. Inoculations of dogs and rabbits with this organism produced warts at the second attempt—" not at the site of injection but at a distance." The illustrations are poor.

M. S. T.

NEVES (Aroeira). Contribuição ao estudo da esporotrichose familiar. [**Familial Sporotrichosis.**]—*Brasil-Medico.* 1929. Jan. 26. Vol. 43. No. 4. pp. 92–94. With 4 text figs.

Four cases are recorded occurring in the children of one family ; their ages were 7, 9, 10, and 12 years, and the lesions, small pustules, were present respectively on the left upper eyelid, the right side of the face, behind the right ear, and the front of the left arm. Cultivation on Sabouraud maltose gave a growth of *Sporothrix beurmanni*.

H. Harold Scott.

LANGERON (Jean). Notes sur l'ulcère phagédénique. [**Notes on Phagedenic Ulcer.**]—*Bull. Méd. du Katanga.* 1928. Vol. 5. No. 3 & 4. pp. 55–60.

After reviewing the more common types of ulceration and treatment, the author lays great stress on the fact that the necrosis may extend through the underlying fascia to muscle and may even involve periosteum and bone. It is then stated that the following treatment will cure an ulcer having a diameter of 16 cm. in about 91 days. This figure is contrasted with the 240 days required by other methods. The lesion is curetted and cleansed with " Eau de Javal " (a chlorinated soda solution) and is then dusted over with a powder containing 2 per cent. of iodoform, 20 per cent. of calcium chloride and 78 per cent. of anhydrous sodium borate. A dry dressing is then applied. On the two following days the same process is repeated and the wound is by then quite clean. For the next fifteen days applications of iodoform in ether are used. This is succeeded by an ambrine dressing every eight days.

M. S. T.

PUFF (Gerhard). Zur Behandlung des Ulcus tropicum, Erfahrungen mit Desitin. [**Treatment of Ulcus Tropicum by Desitin.**]—*Dermat. Woch.* 1929. May 11. Vol. 88. No. 19. pp. 669–671. [4 refs.]

Several severe cases are described in detail, together with the various applications which were used. Apparently " Desitin " ointment proved successful on each occasion. Before it is applied the ulcer is washed thoroughly with an antiseptic lotion, e.g., ½ per cent. chloramine T. It is said to stimulate the growth of epithelium and has also been used with success in cases of burns and the ulcers of leprosy.

M. S. T.

CALLEWAERT-WATSA. Un traitement simple et rapide des ulcères phagédéniques. [**A Treatment for Ulcus Molle Tropicum.**]—*Ann. Soc. Belge de Méd. Trop.* 1929. Mar. 31. Vol. 9. No. 1. pp. 23–24.

The ulcer is dressed with glycerine containing a 2·5 per cent. suspension of iodoform and of dermatol. It is then covered with sterile gauze. Rapid sterilization occurs, the sloughs separate cleanly and healing immediately proceeds without interruption. Surgical intervention is only necessary when bone or tendons are involved.

M. S. T.

ROY (D. N.). **A Report on the Investigation into the Aetiology and Prevention of Naga Sore in Assam.**—*Indian Med. Gaz.* 1928. Dec. Vol. 63. No. 12. pp. 673–687. With 2 charts & 4 figs. in text & 1 plate. [36 refs.]

Like true ulcus tropicum, Naga sore spreads centrifugally with an undermined and infiltrated edge, the base of the ulcer being covered with a greyish-yellow slough. It has certain well-marked differences, however ; in the first place there is no initial papular stage, as the infection can only occur on a site of trauma involving a break in the continuity of the skin, e.g., neck-bites, bamboo-scratches, etc. Lymphangitis, when it does occur, is only local. The disease is not contagious and confers no immunity. Exposed surfaces are the sites of election, particularly the lower parts of the legs. Whilst there is a certain epidemiology dependent on humidity, one tea-garden may be free, whilst its neighbour is heavily infected. The spirochaetes and fusiform bacilli so often found are probably saprophytic only, whilst the exact relationship of a diplococcus found by the author is undetermined. Whatever the nature of the organism, however, there is little doubt that contamination of the initial wound takes place from the soil and is never fly-borne. An efficient preventive treatment is to paint all wounds with a mixture of tincture of iodine and Friar's balsam (proportions not stated) and then apply an occlusive dressing.

M. S. T.

SMITH (H. S.). **The Aetiology of Naga Sore.** [Correspondence.]—*Indian Med. Gaz.* 1929. Apr. Vol. 64. No. 4. p. 239.

In discussing soil contamination as the possible cause of the infection, the author draws attention to certan plantations where thorough cleansing of the feet in phenyl is efficiently controlled. Cases of " water sore " have decreased very markedly, yet there has been no appreciable effect on Naga sores. He points out that " the advent of the ' eye-fly ' and Naga sore are simultaneous."

M. S. T.

DI LULIO (Orestes). Contribucion al estudio del paaj. [**Contribution to the Study of Paaj, a Form of Dermatitis Venenata.**]—*Semana Méd.* 1929. Feb. 7. Vol. 36. No. 6 (1830). pp. 352–355. [1 ref.]

This condition (*ante*, p. 109) was previously believed to be due to irritation by the pollen of Quebracho colorado (*Schinopsis lorenzii*), but the author has shown by experiment that the poison is contained in the leaves at the time of florescence. By rubbing them on the skin, by

instillation of an alcoholic extract or an aqueous distillate the symptoms can be produced, markedly with the first two, mildly with the last.

The symptoms are intense local itching in the course of a few hours, with heat, redness and swelling, and later extension widely to the face and other parts of the body. These persist for several days and finally desquamate.

H. Harold Scott.

PHOTINOS (Théodore). Encore quelques considérations sur la maladie de Robert Lee (Creeping Disease) à propos de la publication de M. Cazenave. [**Thoughts on Creeping Disease.**]—*Ann. Dermat. et Syph.* 1928. June. 6 Ser. Vol. 9. No. 6. pp. 486–507. With 15 text figs. [10 refs.]

The author recounts two published cases of creeping eruption that occurred in his experience in Greece—cases which he regards as typical illustrations of the disease first described in 1874 by Robert LEE. In one, the linear eruption began around the orifice of a fistula that resulted from the opening of an inflammatory tumour on the knee, and thence crept, at the rate of 5–10 cm. in 24 hours, all over the antero-internal surface of the leg and a considerable extent of the thigh. In the other, it began in a raised patch of thickened and sodden skin surrounding the orifice of an umbilical fistula communicating with the intestine (a result of tuberculous peritonitis), and spread, sometimes at the rate of 1–5 cm., but occasionally at the rate of 12–15 cm. in 24 hours, until it had formed a dense labyrinth over the whole surface of the abdomen with extensive ramifications over the chest and left flank. The line of creep was for the most part red, but in some places vesiculous ; sections showed that it lay sometimes in the corneous layer of the epidermis and sometimes between the corneous and Malpighian layers. The affection was not treated, but healed spontaneously in 40 days. Although parasites were not discovered the author has no doubt that the eruption in both these cases was due to larvae of the Oestrid fly Gastrophilus.

The author thinks but little of CAZENAVE's zoogeographical classification (*infra* p. 688) of the various kinds of creeping eruption, but prefers to distinguish two clinically-recognizable varieties of the creeping lesions caused by a variety of parasites. In the typical form of the eruption, caused by the larvae of the Oestrid fly Gastrophilus, the line of creep is filiform, clear-cut, erythematous or vesiculous, but not as a rule inflamed ; and the patient's symptoms are slight. In the non-typical variety, caused by larvae of the Oestrid fly Hypoderma, or by larvae of various Nemathelminthes, the line of eruption is coarser, more swollen, and inflammatory, and the patients' symptoms are more severe, the itching often being intolerable.

A. Alcock.

CAWSTON (F. G.). **The Creeping Eruption, known as "Sandworm Disease" in Natal.**—*Jl. Med. Assoc. South Africa.* 1928. June 9. Vol. 2. No. 11. p. 300. [6 refs.]

——. **The Creeping Eruption of Natal known as Sandworm Disease.**—*Jl. Trop. Med. & Hyg.* 1928. Aug. 15. Vol. 31. No. 16. pp. 201–202. [7 refs.]

The author mentions divers wandering parasites—larvae of bot-flies (Gastrophilus and Hypoderma) and of nematode worms—known to

be the cause of the creeping eruption (called "sand-worm disease" in Natal), but he does not tell us which of them has been recognized in that country. In treatment he has used colloidal antimony, and also ether locally applied on cottonwool, with pressure, at the growing end of the track; and to counteract inflammation, weak carbolic lotion. He speculates on the possibility of the eruption as occurring on the buttocks of young children being due to larvae of parasites present in the bowel.

A. Alcock.

CAZENAVE (E.). **Creeping Disease.**—*Ann. Dermat. et Syph.* 1927. Mar. 6 Ser. Vol. 8. No. 3. pp. 164–177. With 6 text figs. [58 refs.]

Apart from a description of an ordinary case of the eruption in a young woman of 19 years, this paper is a well-documented summary of existing knowledge of the causation of Creeping disease. This causation is varied. In Europe and Africa it is mainly due to the subcutaneous migrations of the young larva of a fly—probably a Gastrophilus; in Japan to those of a small reddish-coloured nematode worm; and in America (Florida in particular) to those of a small worm known only from sections in skin.

A. Alcock.

SMITH (E. C.) & ELMES (B. G. T.). **Creeping Eruption in Lagos.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Nov. 25. Vol. 22. No. 3. pp. 289–290. With 4 figs. on 2 plates. [2 refs.] [Med. Research Inst., Lagos, Nigeria.]

Eight cases of creeping eruption have been observed during the past three years at Lagos. Four excellent photos illustrate the naked eye and microscopical appearances. The lesion advances at the rate of from half-an-inch to two inches in 24 hours. Infiltration by oedema fluid and cellular exudate occurs as the worm passes on. The channel behind becomes swollen to such an extent as to become visible. Secondary invasions by micro-organisms are usual.

R. T. Leiper.

RODHAIN (J.). Etude d'une dermo-épidermite papuleuse épidémique dans le Bas- et le Moyen-Congo belge. [**A Papular Dermatitis Epidemic in the Belgian Congo.**]—*Ann. Soc. Belge de Méd. Trop.* 1928. Dec. Vol. 8. No. 3. pp. 325–341. With 5 figs. on 3 plates. [School of Trop. Med., Brussels.]

This eruption was noted in Leopoldville in 1907 and again at Boma in 1920. In all 41 patients and 61 lesions have been seen, the majority of the lesions being on the dorsum of the foot, round the ankle and on the lower part of the leg. It is proposed to label the disease "Boma Button."

The following description is based on the four cases, which are cited in detail. The lesion starts as a small circumscribed papule which within twelve days grows to a diameter of 12–14 mm. and is then raised 2–3 mm. above the surrounding skin. A deep vesicle then appears in the centre, breaks down and leaves an ulcer roughly 1 cm. in diameter. This ulcer has a greyish-yellow base and may be scabbed over. It is

sharply defined and has a raised, pink and infiltrated edge which in turn is surrounded by an indurated erythemato-urticarial (érysipélateuse) zone. Under local antiseptic treatment these heal within three weeks. When untreated, severe local suppuration and gangrene may occur, although the elimination of the dead tissue usually proceeds normally so that healing is complete in about five weeks. In all cases the corresponding glands are swollen and painful, the lymphatics themselves sometimes being reddened. In some cases small roseolar macules arise round the original lesion and may even spread up the leg and on to the lower abdomen. Slight fever is then usually present for two or three days only.

The histology first shows proliferation and oedema of the mucous layer with inflammation and mononuclear infiltration of the dermis. Vesiculation soon appears deep in the mucous layer and local cellular necrosis occurs rapidly. At this stage it is seen that the papillae are very congested, whilst the greater number of the invading cells are seen to be polymorphonuclears with a few irregularly distributed groups of eosinophils. Usually, the destruction descends only as far as the papillary layer ; it never reaches the subcutaneous tissues.

The acute inflammation and lymphangitis suggest a microbic cause, but direct examination of serum, etc., attempts at culture and the inoculation of material into rabbits and guineapigs have all proved inconclusive, although possibly suggestive of a streptococcal infection. Inoculation of monkeys (Cercopithecus) was successful, whilst glands removed from them showed the usual changes consequent on inflammation only.

Those patients who suffered from more than one lesion showed them in the same stage of development and auto-inoculation was never seen. In a case where a husband apparently infected his wife the incubation period was 13 days. The fact that the papules are always on exposed surfaces leads to the consideration of the implication of biting insects. All the cases occurred during the rainy season of March, April and early May.

It is considered that this disease is a new entity, although somewhat similar to Ecthyma, Dermatitis pratensis and Dermatitis cupuliformis. Stress is laid on the acute onset, the histology, the circular and superficial ulcération, the roseolar rash and the site, together with the seasonal incidence and the absence of auto-inoculation.

M. S. T.

CASTELLANI (Aldo) & DUVAL (Charles W.). **Dermatosis Papulosa Nigra.**—*Arch. Dermat. & Syph.* 1928. Sept. Vol. 18. No. 3. pp. 393–395. With 4 figs. (1 coloured). [1 ref.] [Trop. & Path. Depts. Tulane Univ., New Orleans.]

This disease is common among the negroes of Jamaica and Central America and has been seen in Louisiana. The papules appear on the the face soon after puberty and are black, cupoliform or slightly flattened and have a diameter of 1–5 mm. At first they are smooth, later often roughened, whilst they are neither pruriginous nor painful. The condition gradually becomes more marked, but does not influence the general health of the patient in any way. The cause is unknown and only destructive methods of treatment are efficient. The article is well illustrated.

M. S. T.

SPITTEL (R. L.) & FERNANDO (S. E.). **A Case of Elephantiasis Neuromatosa.** —*Brit. Med. Jl.* 1929. Mar. 30. pp. 596–597. With 4 text figs.

This case occurred in a male Tamil, aged 20 years, and demonstrates the close relationship between this affection and molluscum fibrosum very clearly. "The fibromatosis of the cutaneous nerves merges into a diffuse overgrowth of the skin and subcutaneous tissues." The left leg of this patient weighed 35 lb., out of a total body-weight of 100 lb. There was marked increase in the lengths of the tibia and fibula, whilst dissection of the amputated limb also showed great enlargement of the periarterial sympathetics. The condition is said to have been present at birth and to have progressed with the growth of the boy. At the time of examination both the patient and his mother bore the generalized tumours and pigmentation characteristic of molluscum fibrosum.

M. S. T.

HILL (R. C.). **A Case of Ainhum.**—*New Orleans Med. & Surg. Jl.* 1929. Jan. Vol. 81. No. 7. p. 509.

A typical case affecting the fifth digits of both feet only, the patient being a negress resident in Alabama. The account only covers the clinical picture and history.

M. S. T.

MICHAEL (Jeffrey C.) Exfoliative Dermatitis from Acetarsone (Stovarsol).—*Jl. Amer. Med. Assoc.* 1929. Feb. 23. Vol. 92. No. 8. pp. 645–646. With 2 text figs. [1 ref.]

REVIEWS AND NOTICES.

DEW (Harold R.) [M.B., B.S., F.R.C.S. (Eng.), F.A.C.S., etc.]. **Hydatid Disease. Its Pathology, Diagnosis and Treatment.**—429 pp. With 87 illustrations. 1928. Sydney: The Australasian Medical Publishing Company, Limited. [27s. 6d.]

As stated in the preface by Mr. H. R. Dew, this book marks the culminating point in a series of researches on the biology, pathology and diagnosis of hydatid diseases carried out at the Walter and Eliza Hall Research Institute, Melbourne. From this aspect, as also in point of time, its publication is opportune, since no Australian monograph has appeared on this subject since THOMAS's classical work in 1894.

After a short historical introduction the author reviews in the earlier chapters the life-history and the chief morphological features of *Echinococcus granulosus*. As in other countries, the dog constitutes the chief definitive host, but the probability of dingoes and foxes being implicated is also considered. It is interesting to note that neither animal has yet been shown to harbour this parasite in Australia. Dogs become infected by feeding on the lungs and livers of infected sheep, while man contracts the disease from ova deposited in canine excreta. The valuable work of Clunies Ross on the incidence of hydatid in Australian dogs is epitomized and the author concludes that man is generally infected by direct contact and less frequently through contaminated water and infected vegetables. Owing to their earthy habits children are especially susceptible. The geographical distribution in different countries is considered in a separate chapter, and an instructive correlation between the sheep population and the incidence of echinococcosis in man is shown. Compulsory destruction of all cyst-bearing viscera is advocated as a sound prophylactic procedure.

Chapters IV and V deal admirably with the development of the cystic stage in the intermediary host, including brood capsules and scolices, and here as elsewhere numerous original plates illustrate the text. The vexed question of daughter cyst formation is considered at length. Surgeons have long noted that at operation the mother cyst is generally degenerated when endogenous cysts are present, and this observation led MACCORMICK and, later, DÉVÉ to develop the theory that endogenous daughters arise as a defensive reaction to factors inimical to the existence of the parasite. Mr. Dew ardently supports this view and brings forward from different angles much clinical and pathological data considered to have a bearing on the subject. The reviewer feels that this intellectually satisfying and widely accepted theory would rest on a surer biological foundation had the earlier phenomena of daughter cyst formation been studied in short-lived hosts. The author also denies the intracuticular formation of daughter cysts and has put forward original views regarding the origin of both endogenous and exogenous varieties. The former are held to arise mainly from endocyst and brood capsules, the latter as external herniations of both layers of mother cyst through weaknesses in the adventitia. Neither theory, however, is receiving support from contemporaneous workers and it appears unlikely that they will find so prominent a place in subsequent editions.

The section on pathology deals with cyst distribution and the effects of degeneration and other secondary changes in modifying the course of the disease. Primary lung and liver cysts occur in 80 per cent. of cases and the incidence of intracranial cysts is higher in children than in adults. Rupture may be followed by hydatid anaphylaxis or secondary echinococcosis, while infection introduces an additional element of sepsis. Death of the parasite with absorption of fluid, collapse of the cyst, shrinkage, fibrosis and calcification may follow either of these complications. Since the application of serological methods by different workers at the Walter and Eliza Hall Institute the pre-operative diagnosis has improved from

43·7 to 95 per cent. of cases. Eosinophilia is found in 33 per cent., precipitin reactions in 65, complement fixation reactions in 80, and primary whealing following the intradermal injection of hydatid fluid in 90 per cent. of patients. X-rays prove of special value in determining the anatomical location of a cyst.

Sixteen chapters are devoted to the diagnosis, complications and treatment of visceral hydatids. It is pointed out that differentiation between cysts on the upper surface of the liver and the base of the lung may be made more difficult by pleural effusion. Radiography here proves of special value. The use of the trochar is not advocated, as aspiration may be followed by sudden flooding of the bronchial tree with hydatid fluid.

Medical treatment has proved valueless and operative procedures are varied according to the type and the anatomical location of the cyst and the presence or absence of complications. Great care is taken to prevent secondary infection and soiling of the tissues with cyst contents. Pure formalin is injected into univesicular cysts, but this procedure is considered of little use when daughter cysts are present. The treatment of the adventitial cavity varies. Sometimes it is filled with normal saline before being sewn up ; at other times it is marsupialised or drained. Operative interference in calcareous cysts is deprecated.

The volume closes with a well-reasoned chapter on *Echinococcus alveolaris*, many features of which are explained in terms of an abnormal host reaction to *Echinococcus granulosus*. Its value would have been enhanced by photomicrographs illustrating the transition forms described in the text.

From many viewpoints Mr. Dew's book is an admirable production. It is a well-balanced and practical presentation of a difficult subject and should prove of the greatest value to physicians and surgeons in all countries where hydatid disease is endemic.

Excellent illustrations and clear type are among the many attractive features of this authoritative monograph and reflect much credit on the publishers.

N. Hamilton Fairley.

REICHENOW (Ed.) [Abteilungsvorsteher am Institut für Schiffs- und Tropenkrankheiten in Hamburg] & WÜLKER (Gerh.) [Privatdozent für Zoologie an der Universität Frankfurt a.M.]. **Leitfaden zur Untersuchung der tierischen Parasiten des Menschen und der Haustiere. (Zugleich Neuauflage des gleichnamigen Leitfadens von Braun und Lühe.)** [Key to the Examination of the Animal Parasites of Man and Domestic Animals.]—pp. vii+235. With 104 text figs. 1929. Leipzig: Curt Kabitzsch-Verlag. [Brosch. Rm. 20 ; gebunden Rm. 22.]

This book can be recommended to senior students who wish to refresh their memories of the various technical methods used for the examination of the animal parasites of man and the domestic animals ; it is not a suitable book for beginners. All the methods recommended are good ones, but, except in the case of the worms, they are not described in much detail, and little or nothing is said about the many possible causes of failure. It is certainly convenient to have, collected in a small volume, so many of the essential facts about animal parasites, but it is scarcely possible for the authors to do justice to the subject, or to themselves, in 225 pages of large type, especially as so much of the limited space is occupied by illustrations. The first hundred pages or so are devoted to the Protozoa, which are considered rather thoroughly, but, in a book of this kind, a long differential table of the *Entamoebae* and full-page illustrations of the life-histories of *Haemogregarina* and *Plasmodium* take up more room

than can be spared. About another hundred pages are given to the Helminths; the treatment of these is a much more general one, and therefore more useful, than that of the Protozoa. It is impossible to deal adequately with the Arthropods in the 24 pages which remain. There are more than a hundred excellent illustrations, almost all of which are reproduced from well-known works, and there is a good index.

H. J. Walton.

SERGENT (Edm. & Et.) & PARROT (L.). La découverte de Laveran. Constantine 6 novembre 1880. [**Laveran's Discovery. Constantine, 6th November, 1880.**]—48 pp. With 22 figs. 1830–1930. Collection du Centenaire de l'Algérie. Etudes scientifiques. L'oeuvre médicale de la France en Algérie. 1929. Masson et Cie. Editeurs: 120 Boulevard Saint-Germain, Paris VI.

In 1930 France celebrates the centenary of the colonization of Algeria, a country in which, in 1830, there existed no knowledge of medicine and no ideas of sanitation. The chief method of treatment was by "verses of the Koran written on fragments of paper that were swallowed or worn as charms." Surgery, such as it was, was still practised by the barber. France claims to have caused a revolution of improvement during the past hundred years by means of the soldier, the engineer, the colonist and the doctor of medicine, who, often at the cost of his life, brought to the native population, either in military or civil surroundings, the benefits of medical and surgical art. "La Découverte de Laveran" forms part of a series of small volumes dealing with the political and economic conditions of Algeria; the geography, geology, botany, zoology etc., of the country and "the medical work of France in Algeria." In chapter I the editors consider the various theories as to the etiology of malaria prior to LAVERAN's discovery. They mention unknown animalcules of VITRUVIUS and others which rising from swamp putrefaction entered the blood of men; telluric emanations were suspected and in the nineteenth-century LANZI & TERRIGI (1876) put forward as a cause of ague *Bacteridium brunneum* and this was followed (1879) by the *Bacillus malariæ* of KLEBS & CRUDELI. But as we know these bacilli did not respond to the necessary tests and conditions. Malaria was very common in Algeria and wrought much havoc among the troops and the colonists and it was essential that something more should be known as to its causation. In August, 1878 Major Alphonse LAVERAN who had been acting as a professor at Val-de-Grace was sent, in the ordinary course of military transfers, to Constantine in Algiers. While there, and also at Bone and Biskra he devoted himself to the study of malaria. Beginning with the histology of the tissues he found pigment and pigmented bodies in the blood, etc. Whence did they come? The dead bodies did not answer the question so LAVERAN turned to the living and examined the fresh blood of cases of malaria. He found round pigmented bodies and leucocytes charged with pigment. He wrote: "I had for some time suspected that these elements were of parasitic origin, when, on the 6th November, 1880, while examining a round and pigmented body in a preparation of fresh blood, I saw with astonishment that there existed at the periphery a series of thin filaments very transparent, which moved with great agility and of which the animate nature was incontestable." Thus was LAVERAN led to the discovery of the Plasmodia of malaria which in his original paper (*Comptes Rend. de l'Acad. des Sci.* October 1881) he named *Hæmamæba malariæ* and depicted on a plate which is shown with his manuscript. The illustrations contain two portraits of LAVERAN and several photographs of Constantine.

J. H. Tull Walsh.

ERRATUM.

Vol. 26. No. 6. p. 504, (Tropical Ophthalmology) Second line of fourth paragraph. For China read Japan.